APPENDIX G

CLEAN WATER ACT COMPLIANCE DOCUMENTS

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Appendix G-1

Preliminary Section 404(b)(1) Guidelines Analysis

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APPENDIX G-1

SECTION 404(b)(1) GUIDELINES ANALYSIS

1.0 INTRODUCTION AND REGULATORY BACKGROUND

The North Texas Tollway Authority (NTTA) proposes to design, construct, operate, and maintain a limited-access toll facility referred to as the Trinity Parkway in the City of Dallas, Texas. Transportation improvements are necessary in the Trinity Parkway Corridor to address current and projected transportation needs and deficiencies in existing roadway facilities. The existing transportation problems in the corridor are the result of various urban influences, including high population growth, increased suburbanization, changing employment patterns, trade-related transportation, lack of alternative routes, and high use of single-occupant vehicles. These influences result in slow travel speeds, extended hours of congestion, accidents, reduced air quality due to congestion, and poor attraction of businesses to adjacent areas. Population and economic growth projections for the region indicate that corridor congestion problems would continue to worsen unless action is taken. All of the Build Alternatives for this proposed project would involve impacts to waters of the United States (U.S.), including wetlands, and the potential requirement for an individual permit under Section 404 of the Clean Water Act (CWA) (33 U.S. Code Section 1344). These impacts and other environmental and socioeconomic impacts of the Trinity Parkway are pending review as part of a Final Environmental Impact Statement (FEIS).

This document addresses the requirements of Section 404(b)(1) of the CWA (33 U.S. Code Section 1344(b)(1)), and implementing regulations in 40 CFR Part 230 issued by the Environmental Protection Agency (USEPA). Those regulations are generally referred to as the "Section 404(b)(1) Guidelines" and are so referenced hereinafter. The purpose of this analysis is to identify and evaluate practicable alternatives as defined in the Section 404(b)(1) Guidelines with the objective of minimizing impacts to aquatic resources. Compliance with the Section 404(b)(1) Guidelines is a basic requirement for receiving a permit under Section 404 from the U.S. Army Corps of Engineers (USACE) for the dredge or fill of waters of the U.S., including wetlands. As the USACE is primarily responsible for making the determinations requisite for the issuance of a Section 404 permit, this document is a preliminary analysis under Section 404(b)(1) that may be adapted for use by the USACE in adjudicating a permit application regarding the Trinity Parkway. Accordingly, throughout **Sections 2 – 5** of this preliminary analysis the NTTA is referenced interchangeably with the term "Applicant" for a Trinity Parkway Section 404 permit.

Fundamental to the Section 404(b)(1) Guidelines is the stated purpose to maintain the integrity of waters of the U.S., and prevent degradation of these resources "through the control of discharges of dredged or fill material" (40 CFR Section 230.1). The Section 404(b)(1) Guidelines regulate the discharge of dredged or fill material by requiring each applicant for a Section 404 permit to demonstrate efforts to develop practicable alternatives that avoid or otherwise minimize impacts to aquatic resources, as well as compliance with other regulatory standards designed to prevent degradation of aquatic resources. An alternative is considered to be practicable "if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes" (40 CFR Section 230.10(a)(2)). These three factors are hereinafter referred to as "404 practicability factors" for the purpose of distinguishing this analysis from a separate discussion of practicability pursuant to Executive Order (EO) 11990 (Protection of Wetlands) and EO 11988 (Floodplain Management) in **FEIS Section 2.8** (i.e., "EO practicability").

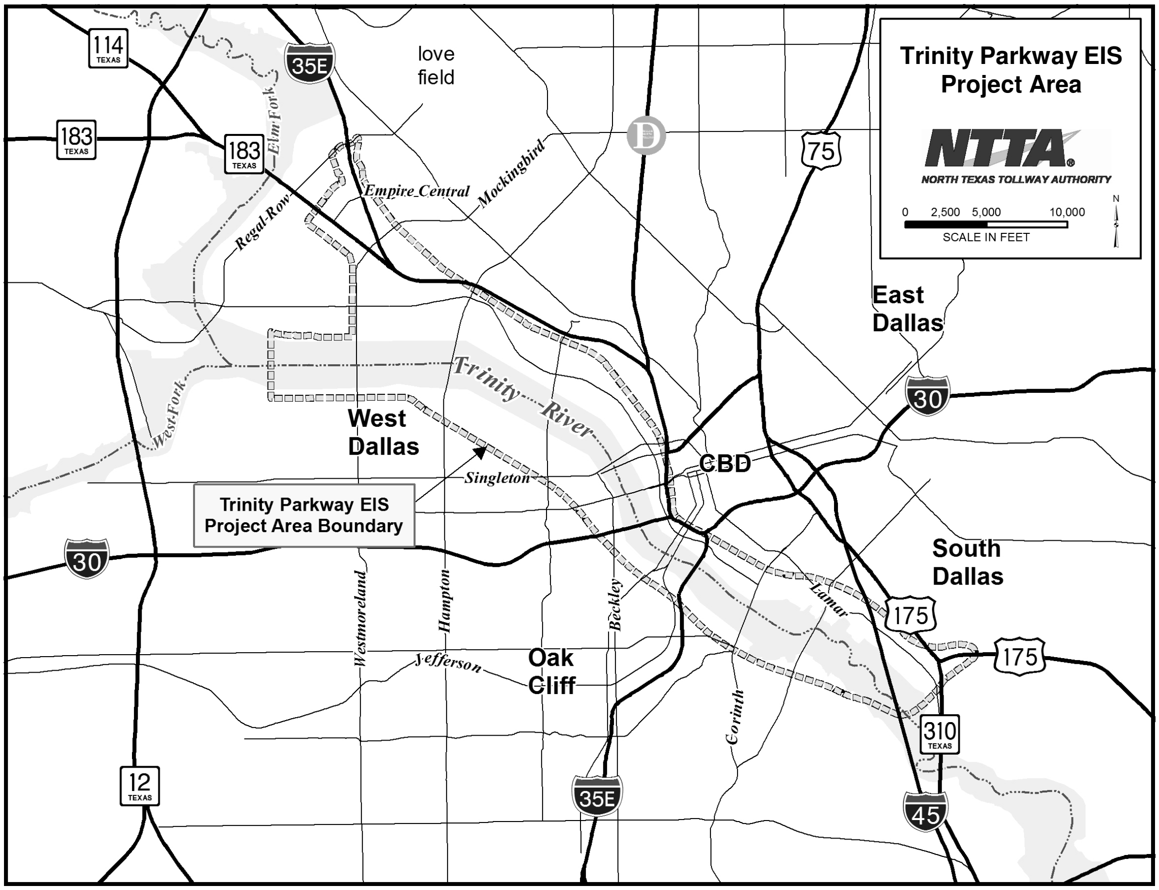
This preliminary analysis has been prepared as a stand-alone examination of Trinity Parkway alternatives, and has been developed in coordination with the USACE Fort Worth District. As such, it includes information extracted from the Trinity Parkway FEIS, along with several new maps at the end of this appendix. In addition, occasional references have been made to further details in specific sections of the FEIS. This analysis examines the Trinity Parkway alternatives and discusses the 404 practicability of the alternatives under consideration in **Section 2**. This is followed by a discussion in **Section 3** of the expected impacts of the Trinity Parkway on the aquatic ecosystem. The analysis concludes with the discussion in **Section 4** of actions relevant to minimizing adverse effects to the aquatic ecosystem and an analysis summary in **Section 5**.

2.0 PROJECT LOCATION AND DESCRIPTION

2.1 Location

The proposed Trinity Parkway Project is located in the Dallas-Fort Worth (DFW) Metroplex of north central Texas. The project area is located on the west side of the City of Dallas Central Business District (CBD) in central Dallas County. The project area boundary extends from the Dallas CBD on the east to West Dallas on the west. The southern boundary is the U.S. Highway (US)-175/State Highway (SH)-310 interchange, and the northern boundary is the IH-35E/SH-183 interchange. The project area includes the Dallas Floodway, a federal flood conveyance and levee system designed to convey floodwaters that drain through the Trinity River main stem. An overview of the project area is shown below in **Figure G-1-1**.

FIGURE G-1-1. TRINITY PARKWAY EIS PROJECT AREA



Predominant aquatic habitat types meeting the regulatory definition of waters of the U.S. within the project area include wetlands, river and stream channels, and open water habitats. The various types of aquatic habitat inventoried and approximate acreage of each within the project area are as follows: emergent wetland, 270.4 acres; forested wetland, 2.9 acres; riverine feature (perennial or intermittent stream), 169.3 acres; old Trinity River channel (open water), 58.8 acres; other open water, 47.6 acres.

2.2 Project Description, Need, and Purpose

The proposed project is the construction of a new limited-access toll facility from the IH-35E/SH-183 interchange (northern terminus) to the US-175/SH-310 interchange (southern terminus), a distance of approximately 9 miles, in the City of Dallas, Dallas County, Texas. This project would provide a reliever route around the existing freeway loop, which encircles downtown Dallas. The proposed tollway would ultimately consist of six mixed-flow mainlanes, local street interchanges, and interchanges between the tollway and freeways at the northern terminus, southern terminus, Woodall Rodgers Freeway, and IH-45. The logical termini for the purpose of evaluating alternatives and impacts of the proposed project are the junctions at IH-35E/SH-183 and US-175/SH-310.

Transportation improvements are necessary in the Trinity Parkway Corridor to address current and projected transportation needs and deficiencies in existing roadway facilities. The existing transportation problems in the corridor are the result of various urban influences, including high population growth, increased suburbanization, changing employment patterns, trade-related transportation, lack of alternative routes, and high use of single-occupant vehicles. These influences result in slow travel speeds, extended hours of congestion, accidents, reduced air quality due to congestion, and poor attraction of businesses to adjacent areas. Population and economic growth projections for the region indicate that corridor congestion problems would continue to worsen unless action is taken.

In the context of this analysis, the project alternatives, including the No-Build Alternative, are considered in terms of satisfying the primary purpose of the Trinity Parkway, which is to provide a safe and efficient transportation solution to manage traffic congestion in the area of the Dallas CBD. The project particularly focuses on assisting with managing congestion in the IH-30/IH-35E interchange (Mixmaster) on the west edge of downtown Dallas; the depressed segment of IH-30 (Canyon) south of the CBD; and the segment of IH-35E (Lower Stemmons) from the Mixmaster north to the Dallas North Tollway (DNT).

2.3 Alternatives

The following sections present a brief history of the proposed project leading up to the development and screening of the proposed Build Alternatives. These proposed Build Alternatives are also summarized in this section, along with the No-Build Alternative. Additional details regarding project history and alternatives may be found in **FEIS Chapters 1** and **2**, respectively.

2.3.1 Project and Alternatives Development History

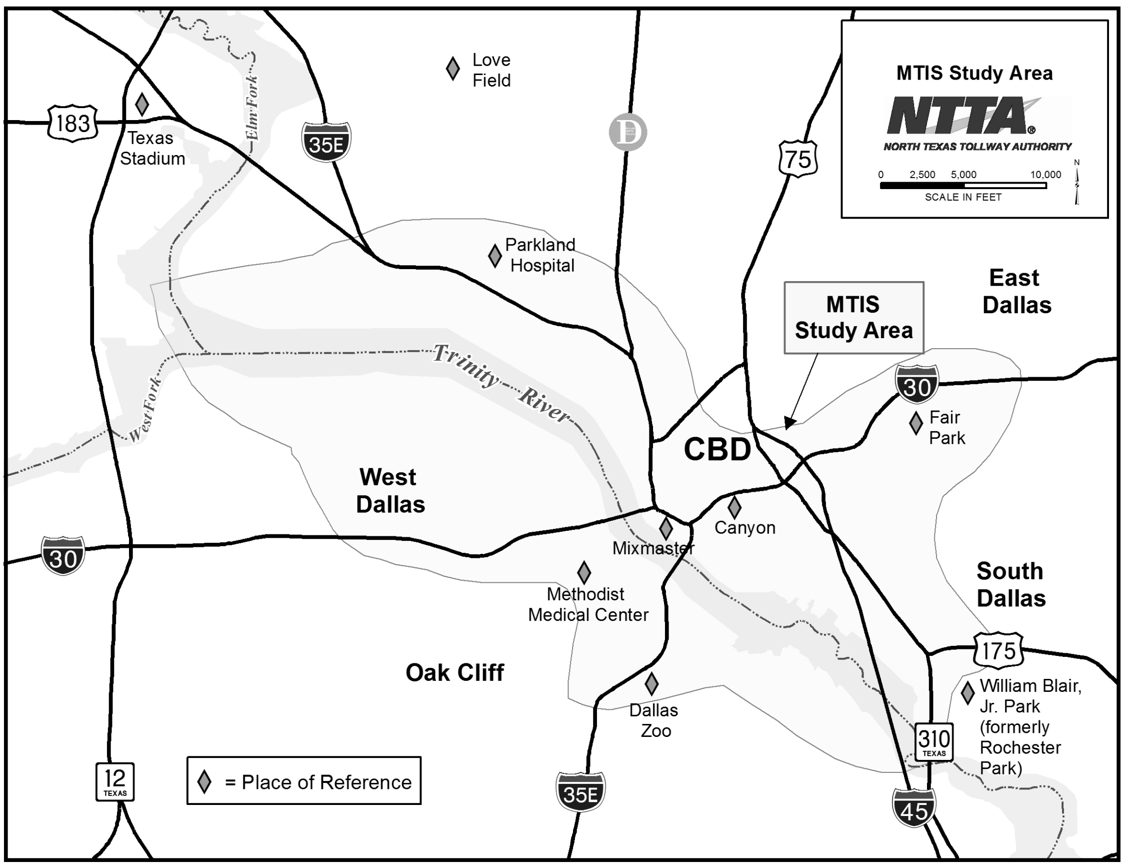
The proposed Trinity Parkway reliever route has been part of the long-range transportation plan in the Dallas area since the mid-1960s, and remains an integral component of current transportation plans and programs for the City of Dallas and transportation agencies including the NTTA, the Texas Department of Transportation (TxDOT), the Federal Highway Administration (FHWA), and the North Central Texas Council of Governments (NCTCOG). Various transportation and urban planning studies in the 1960s through the 1980s examined both the need for a new major thoroughfare corridor coincident with the Trinity River Corridor as well as community interests in enhancing the Dallas Floodway for recreation use and open space. Those earlier studies led to TxDOT's *Trinity Parkway Corridor Major Transportation Investment Study* (MTIS) published in March 1998 (TxDOT, 1998), upon which the modern planning and design development of the Trinity Parkway is founded.

The Trinity Parkway Corridor examined in the MTIS, shown in **Figure G-1-2,** represents the area within which congestion management solutions were sought. The MTIS considered four corridors for the reliever route in detail: IH-35E; Irving/Riverfront (Industrial) Boulevard; east Trinity River levee; and west Trinity River levee. Each of the corridors was considered between the project termini interchanges at IH-35E/SH-183 (north) and US-175/SH-310 (south). The MTIS roadway analysis concluded that an expansion of capacity on IH-35E to meet the full demand of a reliever route was not practical due to excessive cost, physical constraints of additional lanes through the Mixmaster, and impacts to adjacent properties. That is, expanding IH-35E would have necessitated a lengthy double deck roadway to avoid the exorbitant costs that would otherwise be associated with ROW expansion (and building displacements) throughout a highly-urbanized corridor. However, the cost of constructing the double deck facility would have resulted in a construction cost that was estimated to be three to five times greater than alternatives that would be located in the Dallas Floodway; it was also estimated that the IH-35E option would be $400 million greater than a double deck facility along Riverfront (Industrial)/Irving Boulevard and nearly double the cost of an at-grade facility along Riverfront (Industrial)/Irving Boulevard (TxDOT, 1998). The preferred approach was to add high-occupancy vehicle lanes along IH-35E; to improve and expand the Canyon and Mixmaster to the extent practical; and to seek additional capacity through a geographically different route located within the Dallas Floodway or along Irving/Riverfront (formerly Industrial) Boulevard.

The MTIS developed a locally-preferred plan to address transportation problems within the Trinity Parkway Corridor, and to integrate with community plans and goals for the Dallas Floodway. This MTIS recommended plan of action was composed of seven elements, which included improvements to existing facilities, promoting alternative transportation modes, and new facility construction (i.e., the proposed project). The MTIS concluded that all seven components of the recommended plan, as listed below, were needed and that no single measure, or combination of less than all seven measures, would meet the transportation demand and address the transportation problems:

1. Enhanced work trip reduction measures;
2. Bicycle and pedestrian facilities;
3. Enhanced transportation facility management;
4. Improvements to the Canyon, Mixmaster, and Lower Stemmons Freeway Corridors;
5. Extension of Woodall Rodgers Freeway westward across the Dallas Floodway to connect to Singleton Boulevard and Beckley Avenue;
6. A continuous high-occupancy vehicle (HOV) system through the Canyon, Mixmaster, and Lower Stemmons Corridors; and
7. A Trinity Parkway reliever route (proposed action).

FIGURE G-1-2. TRINITY PARKWAY CORRIDOR MTIS STUDY AREA



On September 10, 1997, the Dallas City Council approved the Trinity Parkway Corridor MTIS, including endorsement of the "Split Parkway Riverside" route of the Trinity Parkway as the Locally-Preferred Alternative. The Dallas County Commissioners Court on September 30, 1997, and the DART Board of Directors also approved this plan on October 28, 1997.

Earlier stages of the environmental impact statement (EIS) process built upon the MTIS process, developing into six Build Alternatives and the No-Build Alternative evaluated as part of the Draft EIS (DEIS) in February 2005. Throughout the EIS process, the iterative process of proposing alternatives and receiving feedback from the USACE, other agencies, and the public has shaped the list of candidate alternatives. The six Build Alternatives in the DEIS included two Irving/Riverfront Boulevard Alternatives (2A and 2B), and four Dallas Floodway Alternatives, including Alternative 3A (Combined Parkway – Original), 3B (Combined Parkway – Modified), 4A (Split Parkway Riverside – Original), and 5 (Split Parkway – Landside).

In October 2006, the USACE Fort Worth District provided comments on a draft version of a Supplemental Draft EIS (SDEIS) provided to the District in July 2006. In the comments, the USACE raised several logistic concerns about the Trinity Parkway, specifically focusing on the Build Alternatives located in the Dallas Floodway as detailed in the DEIS. The USACE expressed concern that these alternatives, as proposed, appeared to adversely impact operations and maintenance (O&M) requirements within the Dallas Floodway. The USACE logistic concerns are summarized as follows:

- The project must not interfere with the ability of the USACE or City of Dallas to operate and maintain the Dallas Floodway, conduct flood fighting activities, or restore or improve the flood damage reduction capability of the federal project.
- No cuts, flood separation walls, or retaining walls will be allowed that impact the existing or planned expansion of the Dallas Floodway or Dallas Floodway Extension levees.

The February 2009 SDEIS noted that the USACE considered Alternatives 3A, 3B, and 4A unapprovable due to these logistic issues, and these three alternatives were eliminated from further analysis and consideration. Similarly, the feasibility of realigning or modifying Alternative 5 to address the USACE concerns was evaluated during the development of the Limited Scope Supplement LSS (see documents in **FEIS Appendix A-2**, **pages 12-18**, **25-26**, and **34-40**). The evaluation involved shifting the mainlanes away from the levees and a limited analysis of potential impacts to provide the FHWA with quantitative data to support a decision regarding the viability of a modified version of Alternative 5. The analysis found that a shift away from the levees would result in a substantial increase in residential displacements in minority and low-income neighborhoods and substantially greater costs associated with ROW acquisition and relocation assistance. Specifically, the redesigned Alternative 5 would have resulted in a fivefold increase in the number of residential and commercial/industrial building displacements, and including the displacement of two electrical substations, six churches, the Lew Sterrett Justice Center (county jail facility), the Dawson State Jail, and a building housing the Dallas Floodway levee operations.

The estimated increased cost of ROW and relocation expenses was $748 million, which was over a sixfold increase from the original estimate; approximately $273 million of this estimate would be needed for the displacement of two high-rise buildings that are part of the Lew Sterrett Justice Center. Even in the absence of any increase in construction costs, the ROW/relocation expenses alone caused the overall project construction costs to amount to $1,702 million, which was approximately $380 million greater than Alternative 2B (the next most expensive alternative). However, although no detailed estimates were developed, construction costs would also have increased substantially because the redesign of Alternative 5 would require two full crossings of the floodway (crossing east and west levees twice), and would necessitate pier penetrations of the levees and longer diaphragm walls. Consequently, the FHWA determined that the exorbitant costs of Alternative 5 indicated that it could not be practicably modified to avoid adverse impacts to the levees as identified by the USACE (for further details, see documents in **FEIS Appendix A-2**, **pages 12-18**, **25-26**, **34-40**, and **50-51**).

As a result of the extensive history behind the development of Trinity Parkway design options, four Build Alternatives were identified as reasonable for meeting the need and purpose of the Trinity Parkway (Alternatives 2A, 2B, 3C, and 4B). A brief summary of these alternatives, in addition to the No-Build Alternative, is presented in the following section.

2.3.2 No Action

The USACE has three options available pursuant to Section 404 of the CWA relative to its consideration of the Applicant request for an individual permit: (1) issue the permit for the project as described above; (2) issue the permit with special conditions; or (3) deny the permit. Under the No-Build Alternative, the USACE would deny the Applicant application for an individual Section 404 permit. As a result, the Trinity Parkway would not be constructed, and the potential project-related impacts to the natural environment identified in Trinity Parkway **FEIS Chapter 4** would not occur.

Although the No-Build Alternative avoids construction impacts, the lack of a northwest-southeast reliever route around downtown Dallas would remain. The costs associated with the No-Build Alternative along with the adverse impacts related to traffic congestion could create an undesirable urban environment that would have more long-term adverse impacts than the short-term construction impacts. In the absence of improvements, the maintenance costs of the existing system will continue to increase despite committed congestion management strategies and operational improvements within the corridor boundary. These projects include signalization, intersection improvements, bridge construction, new road construction, and freeway downgrade

(SM Wright Parkway), as inventoried in **FEIS Section 4.15.4**. The public will experience increased vehicle operating costs on under-designed, inadequate facilities and other costs due to higher rates of accidents and incidents on existing facilities. Motorists will also experience a monetary value of time lost due to lower operating speeds, congested roadway conditions, and restricted maneuverability on area roadways. In sum, the No-Build Alternative does not address the purpose for the proposed project as defined above in **Section 2.2** and is excluded from further consideration.

2.3.3 Applicant Alternatives

The Applicant presents various Build Alternatives for the proposed project as described in **Section 2.3.3.2**. In addition to the different Build Alternatives, the Applicant must consider other alternatives pertaining to the geographic region and must demonstrate that other suitable locations are not available to serve the project purpose.

2.3.3.1 Alternative Sites

The nature of the purpose and need for the proposed project necessarily limit the geographic location of project alternatives. The Trinity Parkway Corridor MTIS focused on a study area surrounding the Trinity River and the Dallas CBD because management solutions were needed in this area where traffic congestion was a worsening problem. As described above (**Section 2.3.1**), the MTIS action plan identified a variety of measures in various geographic locations within the Trinity Parkway Corridor MTIS Study Area. However, an important distinction with the MTIS results was the conclusion that all components of the recommended plan were needed, and that no single measure, or combination of less than all the identified measures, would meet transportation demand and address transportation problems in the target corridor. Various local and state agencies have taken responsibility for implementation of the other portions (i.e. locations) identified in the plan and progress has been made regarding other MTIS plan elements in the ensuing years (see **FEIS Section 2.1.2**). Therefore, it would be incorrect to suppose that other components of the MTIS recommended plan are potential alternatives to the proposed project.

2.3.3.2 Construction Alternatives

In light of the foregoing constraints on the development of alternatives, the Applicant has endeavored to develop and has considered multiple distinct Build Alternatives that would meet the overall project purpose. In addition, other project area attributes such as proximity to major transportation thoroughfares and the Dallas Floodway, have guided the development of geographically diverse Build Alternatives within the highly urbanized Dallas CBD. The alternatives under consideration in the Trinity Parkway FEIS, Alternatives 2A, 2B, 3C, and 4B, are described briefly below, and include a summary of anticipated impacts of each alternative to aquatic resources as reported in the SDEIS in 2009 (see **SDEIS Section 4.8**). All alternatives would construct a controlled-access toll road facility with three mainlanes in each direction. The design speed for all alternatives is 60 mph and the proposed project would have a posted speed limit of 55 mph. Additional details related to each proposed alignment are presented in **FEIS Section 2.3**.

Alternative 2A (Irving/Riverfront Boulevard - Elevated) would extend southwest from the IH-35E/SH-183 interchange, turning southeast to follow Irving Boulevard. The route would follow Irving/Riverfront Boulevard for approximately 5.6 miles, passing south of downtown Dallas to Corinth Street. In this segment, the project would be installed as a double-deck structure, above the existing city streets. Irving/Riverfront Boulevard would be almost totally reconstructed with this alternative to resolve conflicts with the supporting structures for the roadway above. The roadways would remain in service to serve local access and through traffic movement. South of Corinth Street, the route would follow a new alignment for approximately 1.2 miles, bending in an easterly direction to reach Lamar Street east of Martin Luther King, Jr. (MLK) Boulevard. From this point, the route would travel southeast along Lamar Street as a double-deck structure, including an overpass of IH-45. The route then would turn east to the US-175/SH-310 interchange. **Figure G-1-3** shows a route map of the Alternative 2A alignment, **Figure G-1-4** shows a computer-generated rendering of Alternative 2A, and **Figure G-1-5** shows the typical proposed design cross-section.

The estimated impacts to aquatic resources of this alternative arising from construction of the toll road within ROW areas would total 4.23 acres, and would be comprised of the following potential fill impacts:

Summary of Alternative 2A Fill Impacts from Roadway Construction

–Emergent wetlands: no impact;	–Old Trinity River Channel: 2.72 acres;
–Forested wetlands: 1.38 acres;	–Intermittent stream: 0.13 acre;
–Open water (intermittent): no impact;	–Trinity River (floodway channel): no impact.

FIGURE G-1-3. LAYOUT MAP OF TRINITY PARKWAY ALTERNATIVE 2A

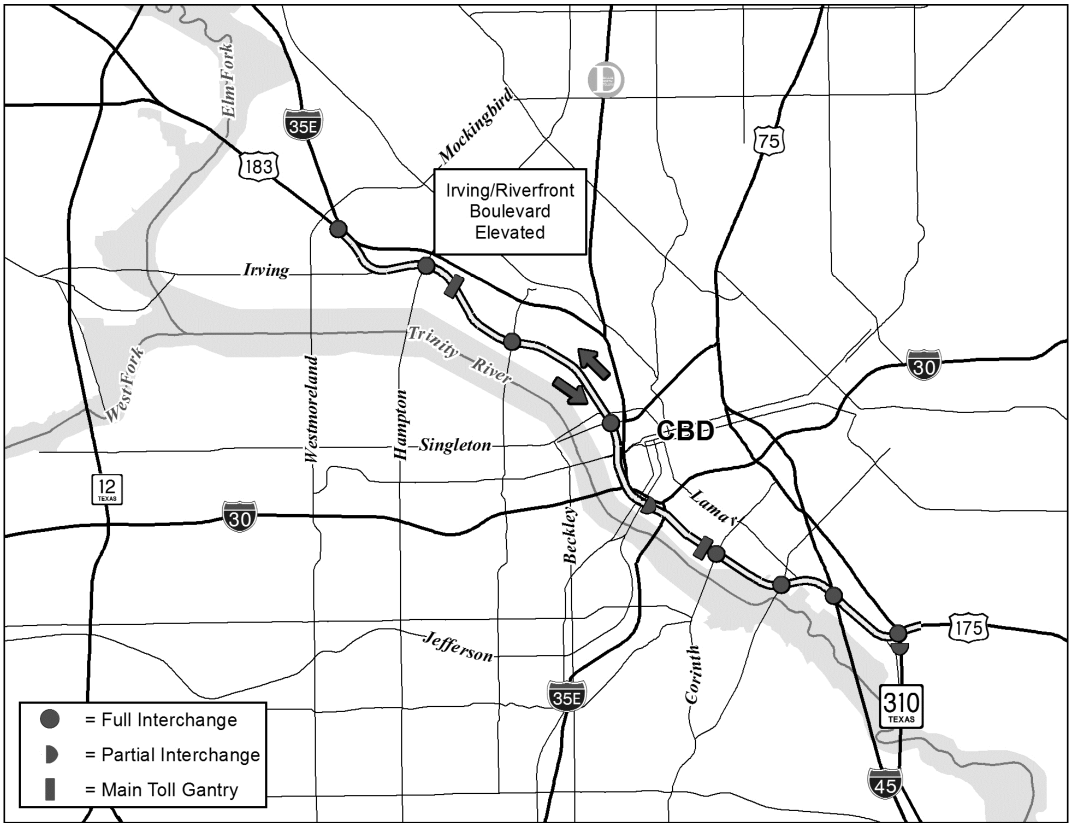


FIGURE G-1-4. COMPUTER RENDERING OF ALTERNATIVE 2A

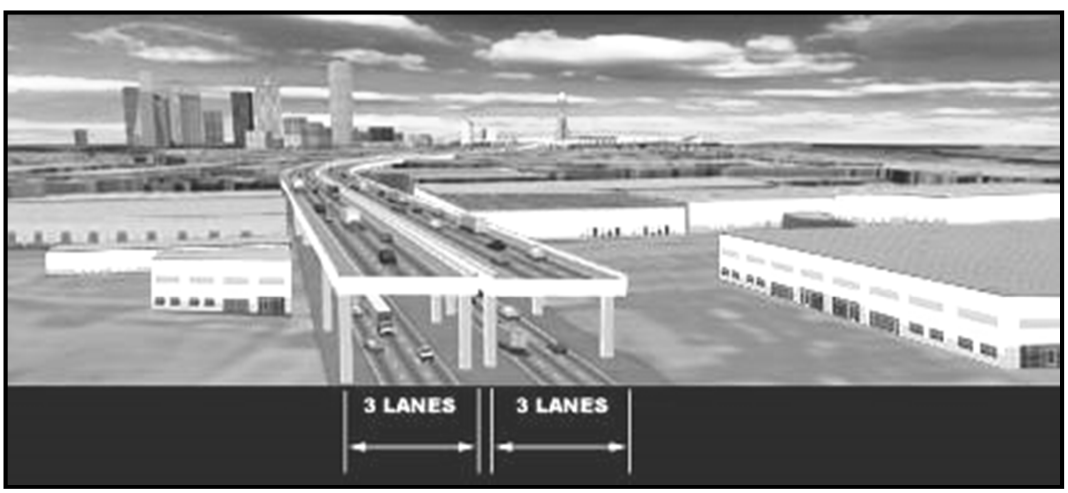
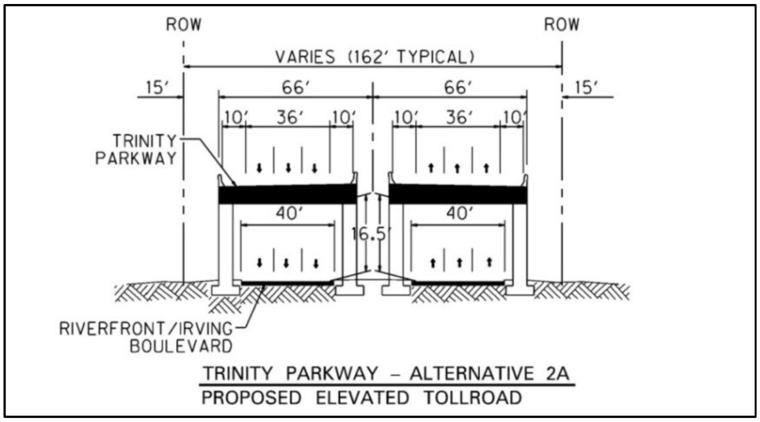


FIGURE G-1-5. ALTERNATIVE 2A TYPICAL SECTION



Alternative 2B (Irving/Riverfront Boulevard - At-Grade) would extend southwest from the IH-35E/SH-183 interchange, turning to the southeast to follow Irving Boulevard/Riverfront Boulevard. Similar to Alternative 2A, the route would follow Irving/Riverfront Boulevard for approximately 5.6 miles to Corinth Street. However, in this segment, the roadway would be installed predominantly at-grade, with service roads provided to make up for the loss of the arterial streets. One-way service roads on each side of the roadway would serve local access and through traffic. Beginning south of Corinth Street, the route would be identical to that of Alternative 2A described above. **Figure G-1-6** shows a route map of the Alternative 2B alignment, **Figure G-1-7** shows a computer-generated rendering of Alternative 2B, and **Figure G-1-8** shows the typical proposed design cross-section.

The estimated impacts to aquatic resources of this alternative arising from construction of the toll road within ROW areas would total 9.07 acres, and would be comprised of the following impacts:

Summary of Alternative 2B Fill Impacts from Roadway Construction

–Emergent wetlands: no impact;	–Old Trinity River Channel: 6.34 acres;
–Forested wetlands: 2.53 acres;	–Intermittent stream: 0.20 acre;
–Open water (intermittent): no impact;	–Trinity River (floodway channel): no impact.

FIGURE G-1-6. LAYOUT MAP OF TRINITY PARKWAY ALTERNATIVE 2B

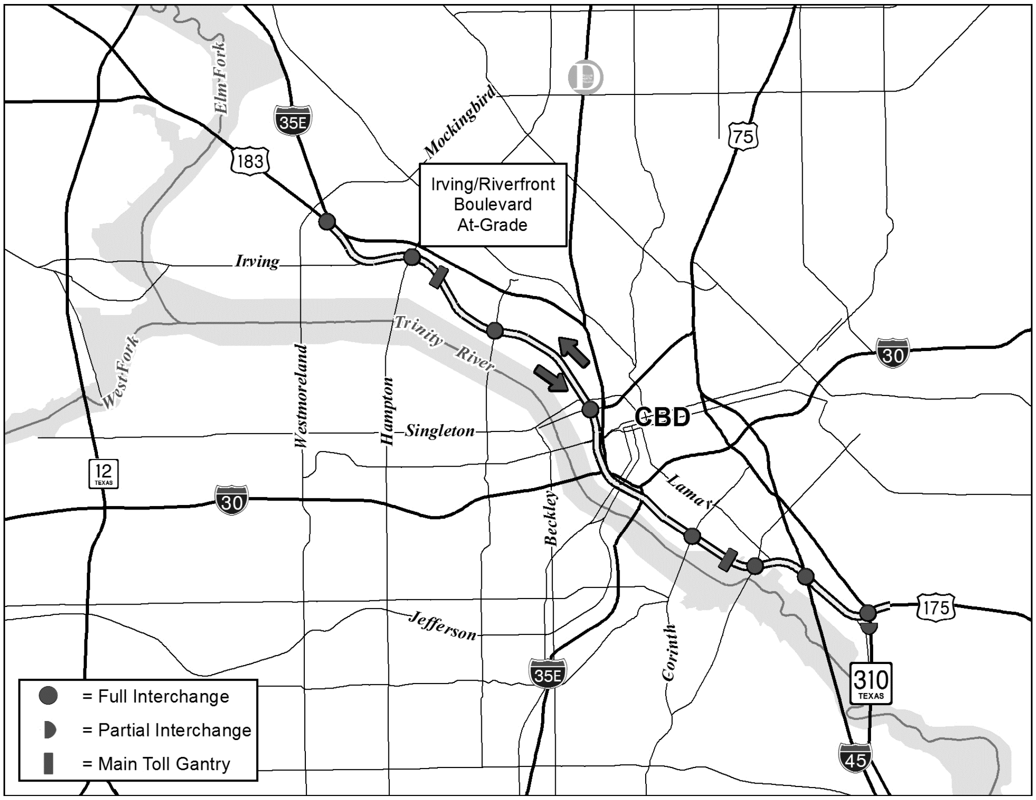
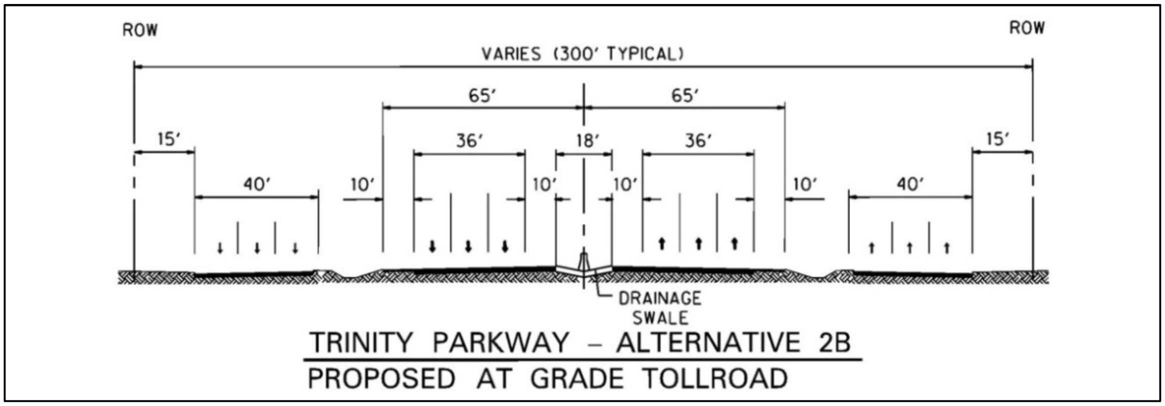


FIGURE G-1-7. COMPUTER RENDERING OF ALTERNATIVE 2B

FIGURE G-1-8. ALTERNATIVE 2B TYPICAL SECTION



Alternative 3C (Combined Parkway - Further Modified) would extend southwest from the IH-35E/SH-183 interchange toward the Dallas Floodway. In the area west of Hampton/Inwood Road, Alternative 3C would turn south along the riverside of the east Dallas Floodway levee, with the mainlanes placed on an earthen embankment, typically set above the 100-year flood level to provide appropriate protection against inundation. However, at points where the alignment would meet existing bridge crossings of the Dallas Floodway, the roadway would be depressed to pass under the existing structures. At these locations, a flood separation wall along the riverside of the roadway would be provided to protect the roadway from inundation during a 100-year flood event. Additionally, pump stations would be provided to drain the low points of the roadway at times that the Trinity River is in flood stage. South of the DART Light Rail Bridge, Alternative 3C would be built on structure and offset approximately 50 feet from the riverside edge of the future USACE Dallas Floodway Extension (DFE) East Levee extension (Lamar Levee) up to a location approximately 1,500 feet downstream of MLK Boulevard. At this point, the Trinity Parkway would cross to the landside of the levee, with the mainlanes elevated sufficiently to allow a 15-foot clearance over the levee top for maintenance/emergency vehicle access. The alignment would follow the landside of the future DFE East Levee to IH-45, where it would pass under the mainlanes of the Interstate. The route would then turn east to the US-175/SH-310 interchange. **Figure G-1-9** shows a route map of the Alternative 3C alignment, **Figure G-1-10** shows a computer-generated rendering of Alternative 3C, and **Figure G-1-11** shows a typical proposed design cross-section within the Dallas Floodway.

The estimated impacts to aquatic resources of this alternative would arise from both construction of the toll road within ROW areas and from the excavation of areas within the floodway for borrow material. The total estimated impacts would be 90.89 acres, comprised of 27.38 acres of fill from roadway construction and 63.51 acres of excavation impacts. Further details regarding the impacts of these two types of construction-related activities are summarized below:

Summary of Alternative 3C Fill Impacts from Roadway Construction

–Emergent wetlands: 17.01 acres;	–Old Trinity River Channel: 1.51 acres;
–Forested wetlands: 1.28 acres;	–Intermittent stream: 0.15 acre;
–Open water (intermittent): 4.45 acres;	–Trinity River (floodway channel): 2.98 acres.

Summary of Alternative 3C Impacts from Borrow Material Excavations

–Emergent wetlands: 20.63 acres;	–Old Trinity River Channel: no impact;
–Forested wetlands: no impact;	–Intermittent stream: no impact;
–Open water (intermittent): 2.53 acres;	–Trinity River (floodway channel): 40.35 acres.

FIGURE G-1-9. LAYOUT MAP OF TRINITY PARKWAY ALTERNATIVE 3C

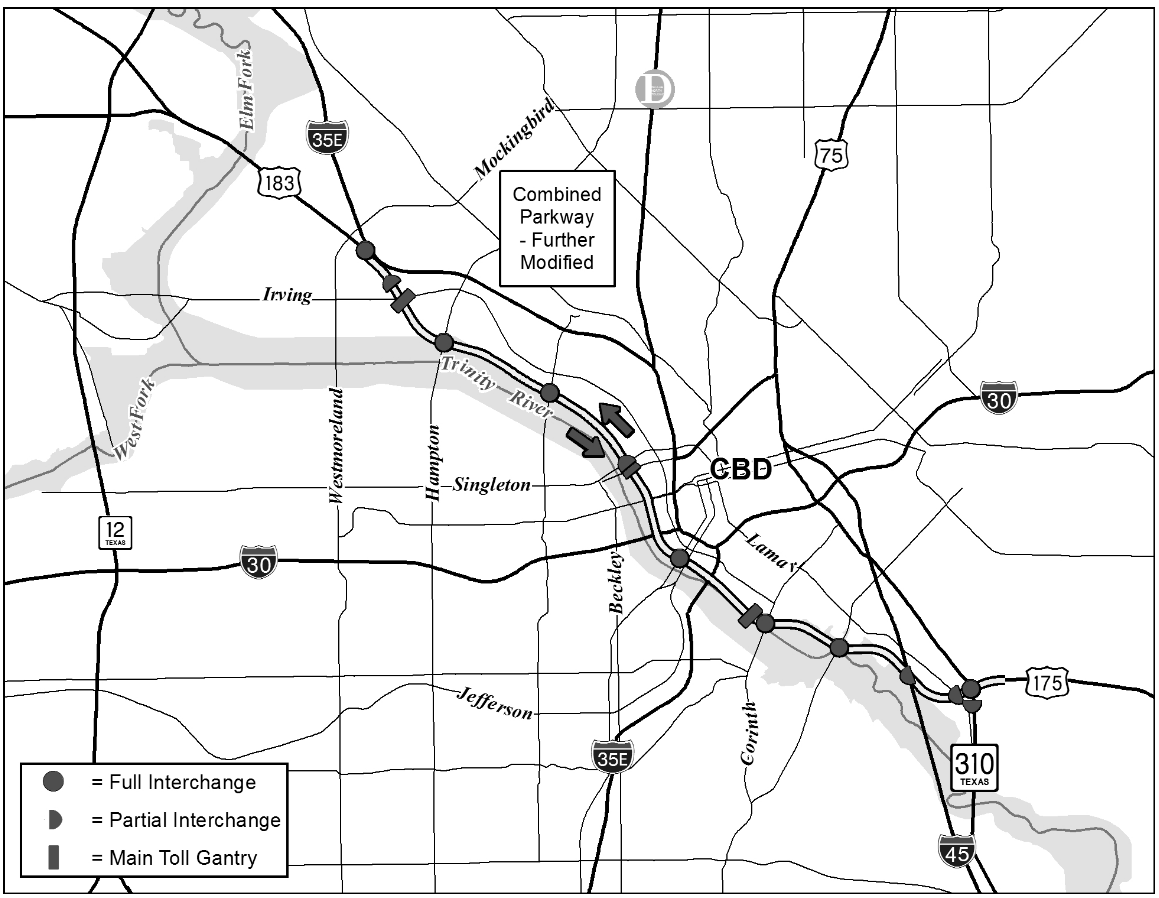
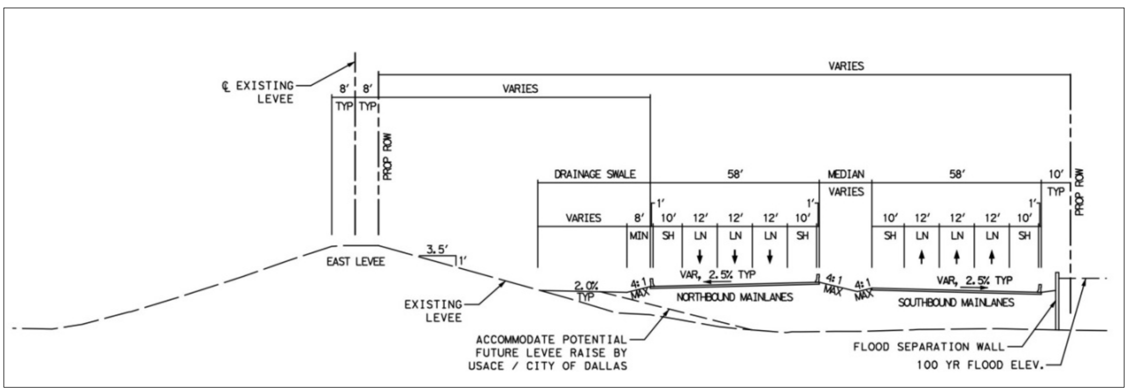


FIGURE G-1-10. COMPUTER RENDERING OF ALTERNATIVE 3C

FIGURE G-1-11. ALTERNATIVE 3C TYPICAL SECTION



Notes:

1. There would typically be three mainlanes of travel in each direction (six lanes total). Auxiliary lanes may be added in some segments, where required to properly accommodate merging areas between ramps. Flood elevations, levee heights, and slopes would vary. Those used in the section would be typical.
2. Modifications and improvements to existing levees would be performed by others.

Alternative 4B (Split Parkway Riverside - Modified) would extend southwest from the IH-35E/SH-183 interchange toward the Dallas Floodway. The mainlanes would be elevated at the crossing point of the Dallas Floodway levees to allow a 15-foot vertical clearance between the bridge structure and the top of future improved levee. This would result in the northbound mainlanes being elevated over the Hampton Road Bridge. Around the East Levee crossing, Alternative 4B would split, with the southbound lanes bridging across the Trinity River to the riverside face of the West Levee and the northbound lanes remaining on the riverside face of the East Levee. The alignment would remain in a split configuration along the Dallas Floodway to a point just east of IH-35E for a total split distance of approximately 5.4 miles. Similar to Alternative

3C, the roadway would be placed on earthen embankments within the Dallas Floodway (typically set above the 100-year flood level to provide appropriate protection against inundation), the tollway would be depressed to underpass the existing structures at points where the alignment would meet existing bridge crossings, and a flood separation wall along the riverside of the tollway would be provided to protect the tollway from inundation during a 100-year flood event at these depressed locations. Additionally, pump stations would be provided to drain the low points of the tollway at times that the Trinity River is in flood stage. **Figure G-1-12** shows a route map of the Alternative 4B alignment, **Figure G-1-13** shows a computer generated rendering of Alternative 4B, and **Figure G-1-14** shows a typical proposed design cross-section within the Dallas Floodway.

The estimated impacts to aquatic resources of this alternative would arise from both construction of the toll road within ROW areas and from the excavation of areas within the floodway for borrow material. The total estimated impacts would be 110.64 acres, comprised of 47.13 acres of fill from roadway construction and 63.51 acres of excavation impacts. Further details regarding the impacts of these two types of construction-related activities are summarized below:

Summary of Alternative 4B Fill Impacts from Roadway Construction

–Emergent wetlands: 35.77 acres;	–Old Trinity River Channel: 1.21 acres;
–Forested wetlands: 1.28 acres;	–Intermittent stream: 0.10 acre;
–Open water (intermittent): 5.79 acres;	–Trinity River (floodway channel): 2.98 acres.

Summary of Alternative 4B Impacts from Borrow Material Excavations

–Emergent wetlands: 20.63 acres;	–Old Trinity River Channel: no impact;
–Forested wetlands: no impact;	–Intermittent stream: no impact;
–Open water (intermittent): 2.53 acres;	–Trinity River (floodway channel): 40.35 acres.

Summary of Impacts to Waters of the U.S., Including Wetlands

As discussed above, the estimated impacts of the four Build Alternatives on waters of the U.S., including wetlands based on the SDEIS/LSS are included as part of the description of each of the alternatives. A comparative summary of estimated impacts to water features by the Build Alternatives is provided in **Table G-1-1**.

FIGURE G-1-12. LAYOUT MAP OF TRINITY PARKWAY ALTERNATIVE 4B

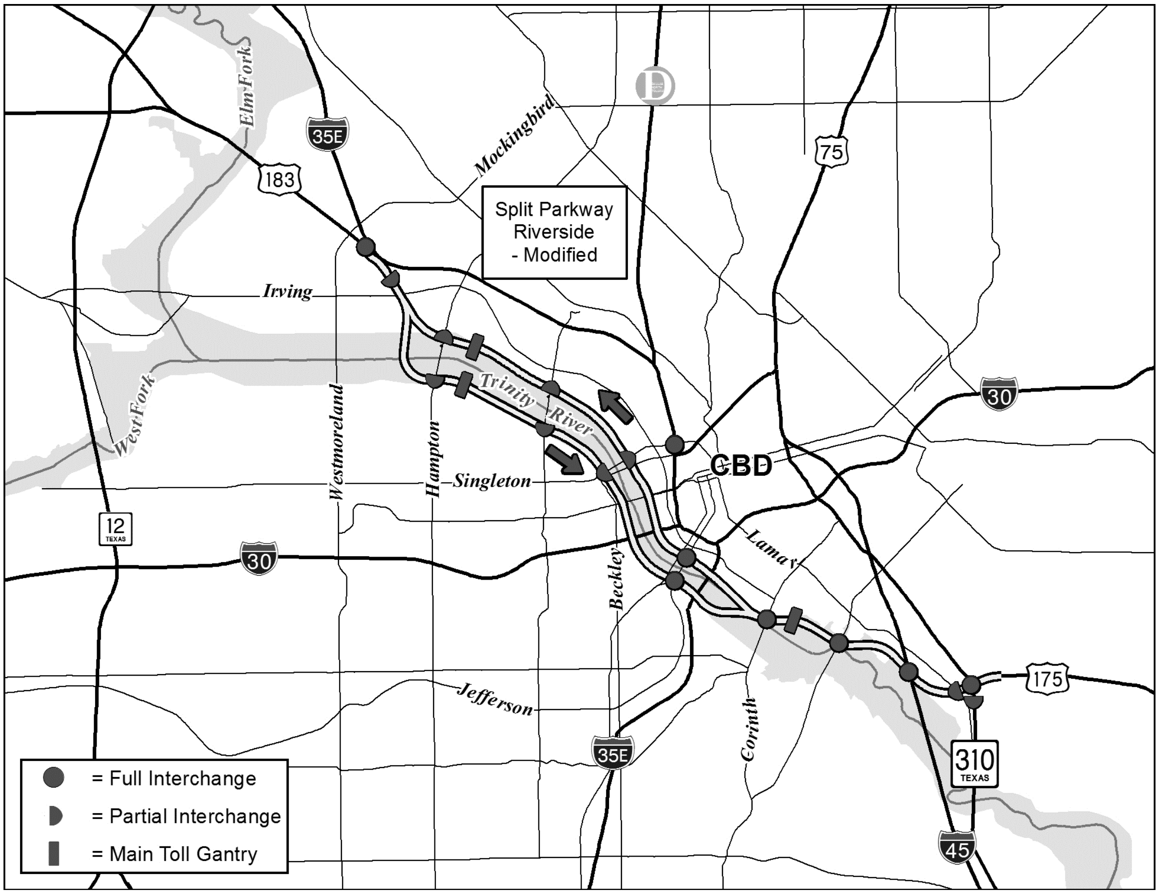
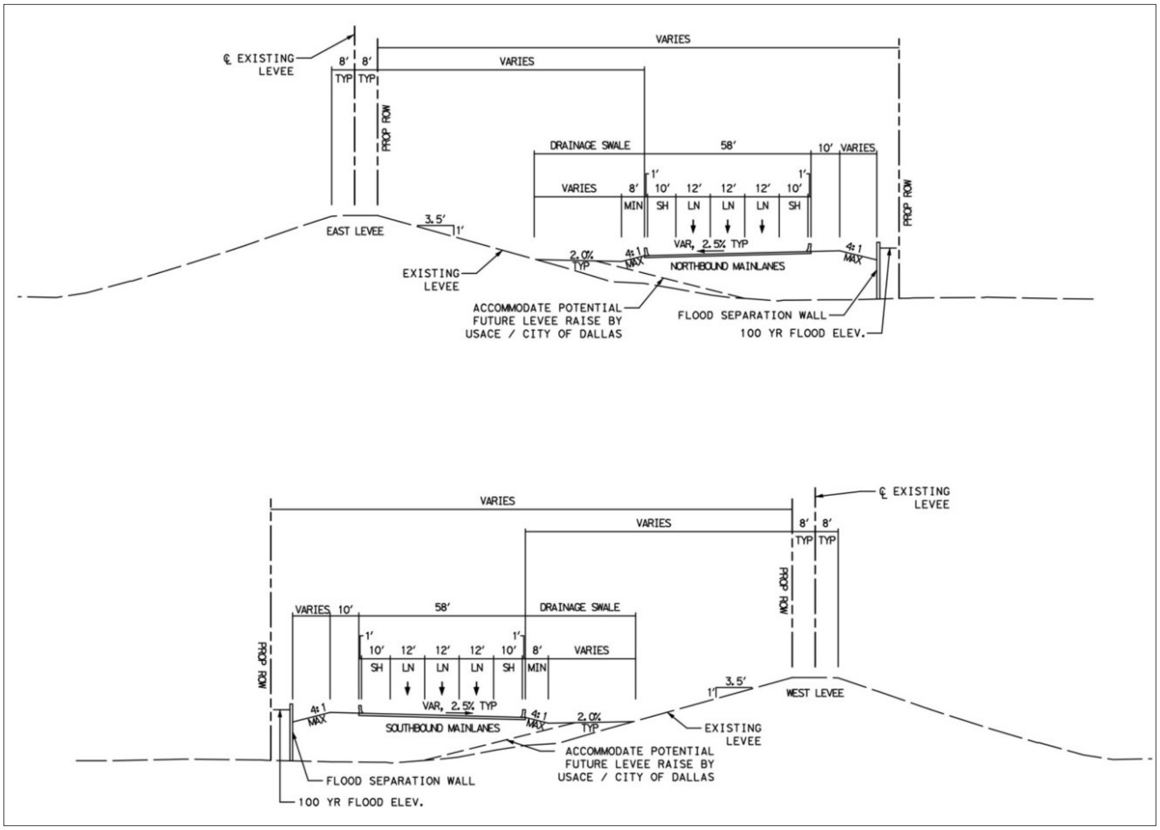


FIGURE G-1-13. COMPUTER RENDERING OF ALTERNATIVE 4B (NORTHBOUND LANES)

FIGURE G-1-14. ALTERNATIVE 4B TYPICAL SECTION



Notes:

1. There would typically be three lanes of travel in each direction (six lanes total) with the northbound lanes adjacent to the East Levee and the southbound lanes adjacent to the West Levee. Auxiliary lanes may be added in some segments, where required to properly accommodate merging areas between ramps. The West Levee section would be similar to the East Levee section.
2. Flood elevations, levee heights, and slopes would vary. Those used in the section would be typical.
3. Modifications and improvements to existing levees would be performed by others.

TABLE G-1-1. SUMMARY OF POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

Build Alt.	Emergent Wetlands		Forested Wetlands		Open Water - Intermittent*		Old Trinity River Channel		Intermittent Stream		Trinity River*		Total	
	Fill	Ex.	Fill	Ex.	Fill	Ex.	Fill	Ex.	Fill	Ex.	Fill	Ex.	Fill	Ex.
2A	--	--	1.38	--	--	--	2.72	--	0.13	--	--	--	4.23	--
2B	--	--	2.53	--	--	--	6.34	--	0.20	--	--	--	9.07	--
3C	17.01	20.63	1.28	--	4.45	2.53	1.51	--	0.15	--	2.98	40.35	27.38	63.51
4B	35.77	20.63	1.28	--	5.79	2.53	1.21	--	0.10	--	2.98	40.35	47.13	63.51

Notes:
1. All quantities shown in acres and reflect impacts as reported in the SDEIS (2009), as supplemented by the LSS (2012). Calculated areas are estimates only. "**Fill**" impacts are expected from roadway construction; excavation ("**Ex**.") impacts are expected from potential borrow areas (see **SDEIS Plate 4-26** for borrow area locations).
2. Expected impacts are based on the jurisdictional determination approved by USACE on June 19, 2006 (File # SWF-2000-00308).
3. **--** = No impact anticipated for this alternative.

* Potential impacts to waters of the U.S., including wetlands, may occur from bridge column construction and can be addressed or eliminated during final design.

2.3.4 404 PRACTICABILITY ANALYSIS

2.3.4.1 Introduction and Alternatives Considered

This section discusses the relevant Build Alternatives based on information developed to a comparable level of detail as of the publication of the SDEIS in February 2009, as supplemented by the LSS in March 2012, as well as feedback from government agencies and members of the public in the public hearings held in 2009 and 2012 and throughout the SDEIS and LSS public comment periods. As described in **Section 1.0**, the Section 404(b)(1) Guidelines define practicable alternatives as those that are available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall purpose. Accordingly, the No-Build Alternative has not been considered in the 404 practicability analysis below because it does not address the purpose of the proposed project, which may be summarized as follows: To provide a safe and efficient transportation solution to manage traffic congestion in the area of the Dallas CBD.

The Section 404(b)(1) Guidelines also require the Applicant to seek out action alternatives that minimize impacts to aquatic resources (40 CFR Section 230.10(a)). As discussed above, the Applicant has developed and evaluated Alternative 4B in terms of meeting the overall project purpose and in terms of impacts. However, as compared to the other three alternatives under consideration, the impacts to aquatic resources (i.e., primarily emergent wetlands) from Alternative 4B would be approximately 20 acres greater than Alternative 3C, which is the next greatest in terms of such impacts among the alternatives. For this primary reason, the Applicant has not submitted Alternative 4B for consideration of a Section 404 permit. The elimination of

Alternative 4B from further consideration in the 404 practicability analysis is in keeping with joint USEPA/USACE guidance on implementing the Section 404(b)(1) Guidelines (USEPA/USACE, 1993). As stated in the guidance, the rationale for this policy stems from a provision of the Section 404(b)(1) Guidelines (i.e., 40 CFR 230.10(a)), which "only prohibits discharges when a practicable alternative exists which would have less adverse impact on the aquatic ecosystem" than the recommended alternative (USEPA/USACE, 1993; see Section 3(a)(ii)).

This 404 practicability analysis seeks to screen Build Alternatives 2A, 2B, and 3C (as described in **Section 2.3.3.2**) according to regulatory criteria. However, the Applicant seeks to receive authorization under Section 404 for fill and excavation impacts necessary to construct Trinity Parkway Alternative 3C. Although Alternatives 2A and 2B would not avoid impacts to aquatic resources, these alternatives would result in substantially fewer impacts to aquatic resources than Alternative 3C. For this reason, application of the Section 404(b)(1) Guidelines to the Trinity Parkway requires the consideration of these two alternatives in the 404 practicability analysis in addition to Alternative 3C. The 404 practicability screening process ultimately results in the identification of a single alternative that meets the criteria of practicability and minimized impacts to aquatic resources.

2.3.4.2 Methodology

The USACE and USEPA rules implementing Section 404 address standards for protection of wetlands and permit criteria, including the selection of sites for the deposition of fill material. Most pertinent here are the Section 404(b)(1) regulations promulgated by USEPA that all permit applicants must satisfy. Under these regulations, the applicant must demonstrate that there is no "practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem" (40 CFR Section 230.10(a)). These regulations further provide: "The term practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes" (40 CFR Section 230.3(q)).

In making its determination of 404 practicability, the USACE analysis is limited to the three factors of cost, technology, and logistics. Also, the USACE does not evaluate these three factors collectively in assessing practicability, but separately examines each alternative in light of each factor to determine whether an alternative is practicable as to that factor. In addition, the determination of practicability of an alternative for each of the three factors is done on a "pass/fail" basis for each factor. If an alternative fails the screening criteria established for any one of the factors, then it is determined to not be practicable. The Section 404(b)(1) Guidelines presume that all alternatives are practicable and require the applicant to demonstrate which alternative, if any, is not practicable.

The methodology outlined above has been applied to the three Build Alternatives under consideration, and adapted to avoid undue repetition of information in the discussion of alternatives. The purpose of this approach is to improve readability but not for the purpose of comparing the grouped alternatives, as the determination of 404 practicability is based on the evaluation of factors as applied individually to each alternative. This is particularly important to project cost because the analysis requires a review of cost elements from similar transportation projects to develop a cost screen or threshold. Thus, grouping the cost analyses for all alternatives obviates the need to repeat the description methodology and facilitates efficient presentation of results.

The 404 practicability analysis reflects information that was developed to the same level of detail and relevant timeframe for all three alternatives as of the publication of the SDEIS (February 2009; see **SDEIS Chapter 4**), as supplemented or updated for some topics in the LSS (March 2012; see **LSS Chapter 4**).

2.3.4.3 Existing Technology

All of the Trinity Parkway Build Alternatives could utilize current engineering technology for roadway and related construction, and there appears to be no unusual or insurmountable technological issues with any of these Build Alternatives. There is expected to be gradual adoption of new or improved technologies in the road building and toll collection fields over time. In general, any special technology (e.g., Intelligent Transportation Systems) for the Build Alternatives is built into the cost estimates discussed above. For this reason, technology is not a screen for the 404 practicability of any of the Build Alternatives and no screening criteria were developed to allow a determination of 404 practicability.

2.3.4.4 Logistics

The three Build Alternatives were examined for the purpose of developing screening criteria for making a 404 practicability determination based on logistics. The approach to evaluating this factor considered the level of difficulty to complete construction as measured by the estimated length of time to construct. This evaluation considered the following subfactors affecting the length of time to construct each alternative: ROW acquisition and relocations of displaced businesses and residences; environmental investigations and demolition of buildings; utility relocations; traffic and safety issues; and challenges related to constructing within a floodplain environment (applicable to Alternative 3C only). The length of startup of engineering/construction activities until the Trinity Parkway could be fully open to traffic is estimated to be 10 years for Alternative 2A, 9 years for Alternative 2B, and 6 years for Alternative 3C. Substantial time to construct any of the Trinity Parkway Build Alternatives would be required due to the large-scale, sequential tasks required for the construction process. However, despite these differences in the time needed to construct the alternatives, such differences do not give rise to an effective logistics screen that would warrant a finding of practicability based solely on logistics.

2.3.4.5 Cost

The analytical approach to determining whether an alternative is practicable as to cost is best summarized in joint guidance issued by the USEPA/USACE on 404 practicability, which provides the following test:

> "The determination of what constitutes an unreasonable expense should generally consider whether the projected cost is <u>substantially greater than the costs normally associated with the particular type of project</u>." (USEPA/USACE, 1993) (emphasis added)

The assessment of whether the cost for a project alternative is practicable therefore depends on establishing a cost screen or threshold based on reasonably comparable projects. This approach seeks to define the range of the principal costs for a proposed project that may be readily compared to the costs incurred or estimated to construct a similar project.

Comparable tollway projects have been examined to form a basis for establishing the upper limit of the range of "normal costs" associated with new location tollways in urban areas. The projects considered all have the following aspects in common with the Trinity Parkway: each is a tollway at least 5 miles in overall length with four to six mainlanes; each is located within an urbanized area in Texas; each required substantial construction of project elements on bridge structures; and each is either a project that was completed within the past 10 years, or is in the advanced planning stage of development. Several projects meeting the foregoing criteria include three portions of the North Texas Tollway Authority's President George Bush Turnpike (PGBT) that were constructed in proximity to the Trinity Parkway, as follows (with year of completion shown): PGBT Segment IV from IH-35E to IH-635 (2005); PGBT Eastern Extension Sections 28-32 from SH-78 to IH-30 (2011); and Phase 4 of the PGBT Western Extension from N. Carrier Parkway to IH-20 (2012). In addition to the PGBT projects, the costs associated with the planned Cesar

Chavez Border Highway West (CCBHW) in the City of El Paso have been considered in this analysis. The CCBHW is a four-lane tollway on new location that is currently under development by TxDOT. Although removed from the DFW Region, this project is comparable to the Trinity Parkway in terms of construction in an urban setting with numerous bridges and other structures. The CCBHW recently completed the NEPA process and is proceeding toward construction procurement. Cost component data used in this analysis were provided by NTTA for the PGBT projects and by TxDOT for the CCBHW. Cost estimate source materials for each of the projects considered are included in **Cost Exhibits 1** through **7**, located after the maps at the end of this appendix.

The approach taken to evaluate the Trinity Parkway Build Alternatives follows USACE guidance and decision precedents that elaborate on what "cost" entails. First, cost does not include anticipated expenses relating to mitigation for natural resource impacts; such costs have been removed from the cost estimates for all of the Trinity Parkway Build Alternatives. Other environmental mitigation costs, such as estimates for hazardous materials abatement for building demolition or construction of noise reduction barriers, are included in construction costs. Second, only costs associated with the Trinity Parkway's "basic project purpose" are relevant. Although the FEIS includes several of purposes of the project, the basic purpose used in the Section 404(b)(1) analysis of costs is as follows: To construct an alternative route to manage congestion from IH-35E, IH-30, and other transportation facilities in the project area to improve mobility and safety without incurring unreasonable costs; costs associated with achieving project planning objectives (e.g., mitigating impacts to natural resources) were excluded in keeping with USACE practice. Third, USACE case precedents indicate that the analysis typically focuses on construction costs and ROW costs (which include costs of utility relocations); accordingly, other costs included in project cost estimates such as engineering design (which are typically a fractional estimate of construction costs) are not included for the limited purpose of assessing practicability based on project costs. For example, construction and ROW/utility relocation costs for Trinity Parkway alternatives represents an average of 84 percent of the total estimated project costs. Again, the purpose is to establish a cost standard by which to judge whether a proposed alternative is practicable as measured against that cost standard; in this regard is not important to capture all potential costs of a project, but identifying the principal costs (i.e., construction cost and ROW/utility relocation cost) facilitates the establishing a cost screen/standard. That is, all methods of estimating costs for transportation projects include construction and ROW/utility relocation costs, whereas other cost estimates or reports do not always include a breakdown of all other project-related costs. In this regard, consideration was given to including the costs of facility O&M after construction but this cost element was excluded because it is not available for the comparable projects used to develop a cost screen; in addition, the annual cost for O&M for the Trinity Parkway Build Alternatives varies from $1.5M to $4.5M per year (see **LSS Table 4-32** and **LSS Appendix D**), indicating that this would not be considered a major cost factor for purposes of developing a cost screen even if such data were available for comparable projects. Finally, costs to relocate 20 Oncor power transmission line towers recently constructed along Irving/Riverfront Boulevard were removed from the utility relocation estimates for Alternatives 2A and 2B, as it is USACE policy/practice to exclude the cost of undoing major actions that have been taken after identifying an alternative.

Applying the approach outlined above, **Table G-1-2** shows the estimates (2011 dollars) for principal cost components based on the number of mainlane miles per project for the three Trinity Parkway Build Alternatives. Principal cost components based on either actual or estimated costs (CCBHW only) for comparable toll road projects are shown in **Table G-1-3**. All cost estimates in **Table G-1-3** have been adjusted to reflect 2011 dollars from the original year of the cost estimate (shown in the bottom row of the table). All costs have been rounded to the nearest million dollars.

TABLE G-1-2. SUMMARY OF TRINITY PARKWAY PROJECT COST COMPONENTS

Project Feature (all costs in 2011 dollars)	**Trinity Parkway Alternatives**		
	2A	**2B**	**3C**
Project Length (mainlane miles)	*52.8*	*52.8*	*52.8*
Construction Cost Total in $ millions (M) ($M/mainlane mile)	1,394 (26.4)	1,068 (20.2)	1,014 (19.2)
ROW/Utility Relocation Cost Total in $M ($M/mainlane mile)	593 (11.2)	512 (9.7)	142 (2.7)
Combined Above Costs in $M ($M/mainlane mile)	**1,987 (37.6)**	**1,581 (29.9)**	**1,156 (21.9)**

TABLE G-1-3. SUMMARY OF COST COMPONENTS FOR COMPARABLE TOLL ROADS

Project Feature (all costs in 2011 dollars)	**President George Bush Turnpike**			**Cesar Chavez Border Hwy West**
	Segment IV	**Eastern Extension Sec. 28-32**	**Western Extension Phase 4**	
Project Length (mainlane miles)	*31.8*	*59.4*	*39.0*	*33.1*
Construction Cost Total in $ millions (M) ($M/mainlane mile)	256 (8.1)	564 (9.5)	404 (10.4)	464 (14.0)
ROW/Utility Relocation Cost Total in $M ($M/mainlane mile)	46 (1.4)	125 (2.1)	2 (0.04)	148 (4.5)
Combined Above Costs in $M ($M/mainlane mile)	**302 (9.5)**	**689 (11.6)**	**406 (10.4)**	**612 (18.5)**
Year of Original Cost Report or Estimate	2005	2013	2013	2012

As indicated in **Table G-1-3**, the cost ranges appreciably among comparable toll road projects from $10 to $20M per mainlane mile. Although these projects are quite comparable to the Trinity Parkway in terms of the selection criteria, cost differences between major transportation projects will always occur because no two projects are identical. However, a qualitative examination of these projects has been made to provide insights into the variability in the observed construction and ROW/utility relocation costs.

Most notably, the ROW/utility cost component for the PGBT projects is relatively small as compared to most Trinity Parkway alternatives and the CCBHW. This cost difference can be attributed to most of the ROW for the project being acquired or donated to TxDOT during the 1970s and 1980s. Decades later when the project was built, the ROW costs were unusually low because this already expended cost was not included in the project ROW cost reporting. For example, the extremely low ROW cost for the PGBT Western Extension Phase 4 is a result of acquisition of nearly all ROW prior to NTTA assuming responsibility for the project. Available reports indicate that the NTTA made a lump sum payment of $458M to TxDOT for its previous work on all four phases of the Western Extension. However, a breakdown showing how much of this payment to TxDOT was for previously-acquired ROW is not available. This suggests that the ROW component, which generally represents the bulk of the ROW/utility relocation cost, is under-represented in **Table G-1-3** for the Western Extension as well as possibly other segments of the PGBT.

Another major cost difference between the PGBT projects and the Trinity Parkway alternatives is that the cost of construction per mainlane mile for the Trinity Parkway is generally double the cost of the PGBT. Again, this difference is at least partially attributable to the early acquisition of land for the PGBT as this prevented development of much of the corridor in the decades between the time of ROW acquisition and construction. Thus, although the PGBT was constructed in an urban area, much of the corridor was undeveloped due to early acquisition of ROW. In contrast, a substantial component of the construction cost for the Trinity Parkway alternatives would be demolition of existing pavement and structures, as well as cost associated with the abatement of associated hazardous materials such as asbestos. However, the primary aspects that influence construction cost for the Trinity Parkway alternatives are the numerous bridges, ramps, walls, embankments, and other structures that are relatively expensive contributors to overall cost. In comparison, a relatively greater amount of the PGBT was built as an at-grade facility in areas not quite as urbanized as downtown Dallas. In this regard, the CCBHW is quite comparable to the Trinity Parkway because of its predominance of structures in its design and its highly urbanized setting.

The foregoing evaluation of comparable toll roads suggests that the relatively low construction and ROW/utility relocation costs for the PGBT projects may be attributed to historical and design differences as compared to the Trinity Parkway. Thus, the comparatively lower cost per mainlane mile of $10M to $12M for the PGBT may be explained by referencing those differences as discussed above. The cost estimate for the CCBHW would have construction and ROW/utility relocation costs of $19M per mainlane mile, which is taken to approximate the higher end of the spectrum of ”the costs normally associated with the particular type of project” (USEPA/USACE, 1993). Accordingly, it has been concluded that the effective cost screen in this FEIS is $20M per mainlane mile for combined construction and ROW/utility relocation costs, and that Trinity Parkway Build Alternatives with comparable costs that are “substantially greater” than this threshold are not considered to be practicable.

The difference between the Trinity Parkway alternatives and this cost screen, expressed in 2011 dollars and as a percentage increase above the cost screen, are shown in **Table G-1-4**. Based on the information available for this analysis, and allowing for the vagaries inherent in estimating the costs of major projects, it appears that Build Alternative 3C is reasonably (i.e, 10 percent) within range of the cost screen based on the costs normally associated with this type of project, and that Build Alternatives 2A and 2B are substantially greater (i.e., 88 and 50 percent, respectively) than the cost screen estimate of $20M per mainlane mile. Based on the foregoing analysis, Build Alternative 3C is practicable and Build Alternatives 2A and 2B are not practicable under the cost criterion of the Section 404(b)(1) Guidelines.

TABLE G-1-4. APPLICATION OF COST SCEEN TO TRINITY PARKWAY ALTERNATIVES

Project Cost Estimate (all costs in 2011 dollars)	**Trinity Parkway Alternatives**		
	2A	**2B**	**3C**
Construction and ROW/Utility Relocation Costs in $M/mainlane mile	37.6	29.9	21.9
Cost Screen for Construction and ROW/Utility Relocation Costs in $M/mainlane mile	20.0	20.0	20.0
Difference Between Alternative Cost Estimate and Cost Screen in $M/mainlane mile	17.6	9.9	1.9
Percent Difference Between Alternative Cost Estimate and Cost Screen	**88%**	**50%**	**10%**

2.3.4.5 404 Practicability Summary

The foregoing discussion of the three 404 practicability factors indicates that Alternatives 2A and 2B are not practicable because these alternatives have substantially greater costs than what is normally expected for projects of this type. The 404 practicability analysis indicates that Alternative 3C is not substantially greater than the cost screen established from an examination of comparable toll road projects planned or constructed in urban settings, and is therefore considered the only practicable Build Alternative that meets the overall project purpose.

2.3.4.6 Development of Alternative 3C since the LSS

As Build Alternative 3C is the only practicable alternative based on the 404 practicability screening analysis above, all references to project characteristics and impacts throughout the remainder of this analysis apply only to Build Alternative 3C. Moreover, the Applicant has developed the design of Build Alternative 3C to a higher level of detail since the LSS and has generally updated the information regarding the expected environmental impacts of this alternative. The updated impacts for the refined design of Build Alternative 3C are likewise reflected throughout the remainder of this analysis pursuant to the Section 404(b)(1) Guidelines.

Since the FHWA designated Alternative 3C its recommended alternative in 2012, the design of Alternative 3C has been further refined to ensure engineering functionality with adjacent major interchanges at the proposed project's northern and southern project termini. These design refinements have been necessitated because of interim developments affecting other transportation projects that would alter these interchanges. **FEIS Sections 2.9.1.1** and **2.9.1.2** present details relating to the transition of the Trinity Parkway with these adjacent major interchanges. The design refinements necessitated expansion of the northern portion of the project area due to the deferral of Project Pegasus from the Metropolitan Transportation Plan due to lack of funding, as discussed in **FEIS Section 1.1.1**. Additionally, portions of the original Trinity Parkway engineering design at the southern end of the project area have been incorporated into the independent SM Wright Project (see **FEIS Section 1.1.2**), thereby necessitating adjustments to the design of Alternative 3C and minor alterations to the project area. The same general refinements to the design for Alternative 3C to accommodate transition requirements at both project termini would also be required for Alternatives 2A, 2B, and 4B; therefore, this modification to project design would not be a basis for distinguishing among these alternatives.

An overview of the design refinements (i.e., schematics and typical cross sections) to the FHWA-recommended Build Alternative 3C is provided in **FEIS Plate 2-8** (**Sheets A-D**). A detailed plan view of the paving outline, bridges, ROW limits, and other design features overlain on an aerial photograph is shown in **FEIS Plate 2-9** (**Sheets 1 – 19**). Alternative 3C would be approximately 8.79 miles in length, would require approximately 559 acres of ROW (reflects additional ROW needed for the transition with IH-35E and SH-183 at the northern terminus as discussed in **FEIS Section 2.9.1**), and would cost approximately $1.31 billion (2013 dollars) to construct. The construction and ROW cost estimates for Build Alternative 3C and cost participation by involved agencies are discussed in **FEIS Chapter 6** and the updated cost estimate for Alternative 3C is in **FEIS Appendix D**. Major interchanges associated with design refinements for Alternative 3C would include the following:

- Direct connections at the IH-35E (Lower Stemmons)/SH-183 interchange (northern terminus), the US-175/SH-310 interchange (southern terminus), Woodall Rodgers Freeway (north side only), and IH-45;
- Full diamond interchanges at Hampton/Inwood Road, Sylvan/Wycliff Avenue, the proposed Jefferson Memorial Bridge (project by others) (see **FEIS Section 2.7.1** for details), Corinth Street, and MLK;
- Half diamond interchanges at Commonwealth Drive, Continental Avenue, and Lamar Street, and SH-310; and
- Connection to IH-35E (South R.L. Thornton Freeway) via the proposed Jefferson Memorial Bridge (project by others).

In light of the importance of project cost estimates for the 404 practicability analysis, the revised cost estimate based on design refinements for Alternative 3C led to an update of the cost factor. This look back to the 404 practicability analysis was done to determine how Alternative 3C, as redesigned, would compare to the 2011 cost estimate. Project costs from 2013 were adjusted to 2011 dollars and are shown in **Table G-1-5** to facilitate comparison with cost data from **Tables G-1-2** and **G-1-4**. These data indicate that the updated design for Alternative 3C results in construction costs and ROW/utility relocation costs that are less than the cost screen discussed above. Further analysis was completed to ascertain the major elements of costs considered that would account for the large reduction in overall cost (i.e., approximately $146M). The greatest cost reduction for Alternative 3C is the result of a greatly reduced volume of earth excavation and embankment fill, which produced a $67M reduction in cost. This design change is linked to the decision to not have the Trinity Parkway place fill on the East Levee sideslope adjacent to the roadway embankment, as this step is no longer needed to facilitate the raising of the levee. Construction cost reductions related to various structures resulted in a net saving of approximately $19M. Although the cost estimates for various types of wall structures (i.e., security, flood separation, diaphragm, slurry, and retaining walls) would add $90M above the 2011 estimate, cost reductions in redesigned mainlane, ramp, and other bridges amounting to $108M would more than offset that increase. Other design changes that produced substantial reductions in construction cost components included costs for drainage (-$9M), traffic barriers (-$6M), and traffic control (-$19M).

TABLE G-1-5. COST SCREEN APPLIED TO ALTERNATIVE 3C DESIGN CHANGES

Project Cost Estimate (all costs in 2011 dollars)	Trinity Parkway Alternatives	
	3C-LSS (old)	**3C-FEIS (new)**
Project Length (mainlane miles)	*52.8*	*52.8*
Construction Cost Total in $ millions (M) ($M/mainlane mile)	1,014 (19.2)	867 (16.4)
ROW/Utility Relocation Cost Total in $M ($M/mainlane mile)	142 (2.7)	146 (2.8)
Combined Above Costs in $M ($M/mainlane mile)	**1,156 (21.9)**	**1,013 (19.2)**
Cost Screen for Construction and ROW/Utility Relocation Costs in $M/mainlane mile	20.0	20.0
Difference Between Alternative Cost Estimate and Cost Screen in $M/mainlane mile	1.9	-0.8
Percent Difference Between Alternative Cost Estimate and Cost Screen	**10%**	**-4%**

2.4 Description of Dredged or Fill Material

2.4.1 General Characteristics

An overview of the Trinity Parkway project area is shown on an aerial photograph in **Map 1** (located at the end of this analysis), which also shows the aquatic features that have been identified. These features are grouped as either waters of the U.S., including wetlands, or non-waters of the U.S. features (i.e., man-made linear sumps along the outside toe of the Dallas Floodway levees), and are identified individually in **Map 2**. These aquatic features are further described below in **Section 2.5**.

The project area is located along the western edge of the Blackland Prairies subregion in the Gulf Coastal Plains physiographic region (BEG, 1996). The Blackland Prairies subregion is characterized by calcareous limestones formed in marine environments during the Cretaceous period (66-144 million years ago; Spearing, 1991; GTSF, 2012), and by other sedimentary rocks such as sandstones and mudstones that formed along ancient coastal areas. Throughout this subregion Quaternary period geologic features also occur, which are consolidated and unconsolidated deposits primarily from alluvial processes within major watershed drainages occurring over the past 2 million years. As the project area is located within the valley of a major regional river, all of the floodplain areas are comprised of Quaternary alluvial or terrace deposits (USGS and TWDB, 2007). These alluvial deposits are associated with the Trinity River and are the result of transported sediments from a variety of limestones, marls, sandstones, and clay bedrocks found throughout the upper Trinity River watershed (BEG, 1972). These alluvial sediments, composed primarily of unconsolidated sand, gravel, silt, and clay, are found in and above the river and tributary creek floodplains.

The majority of surface water bodies in the project area have been substantially modified from prehistoric natural conditions. These changes started in the late 1920s when the City of Dallas began a major effort to control flooding of the Trinity River in and around the downtown area. The most substantial change involved the diversion of the Trinity River (old river channel) to its current location within the Dallas Floodway Levee System that was constructed in the 1950s. The Dallas Floodway consists of a relatively straight pilot channel just downstream of the confluence of the Elm Fork and West Fork Trinity River. This channel is flanked by earthen levees generally constructed at a 3:1 slope, with a maintained cover primarily of non-native grasses such as Johnson grass (*Sorghum halepense*) and Bermuda grass (*Cynodon dactylon*). The Dallas Floodway has several adjacent storage sumps along with other flood control features, which were created from the drainage basins bisected from construction of the Dallas Floodway (e.g., West Fork and Elm Fork). These sumps represent a wide variety of storage capacities, drainage area, and land use. There are seven sump areas in the project area with six having pumping stations that consist of both high- and low-rate pumps. These pump stations, in addition to seven pressure sewers, drain most of the areas on the landside of the levees.

Sumps in the project corridor intercept and temporarily store stormwater before eventual release to the river by a gravity sluice, pumping over the levees, or gravity flow through the sump system until it reaches the river. The pumps start operating when sump water levels reach pre-programmed elevation values. In some instances, the sumps are drained in part by gravity sluices. Although the flow of stormwater through the sump system is regulated solely by flood control requirements, the sumps may function as sedimentation basins that potentially provide a minimal level of purification of stormwater.

Soils data for the project area were obtained from the Natural Resources Conservation Service (NRCS) Soil Data Mart (NRCS, 2011), which is largely derived from the Dallas County Soil Survey (SCS, 1980). Soils within the Dallas Floodway and in floodplain areas downstream are Trinity clay, frequently flooded, generally characterized with historic mechanical disturbance from the construction of levees, floodplain modification, and river channelization. Virtually all soils in the project area have developed within a depositional environment, both before and after construction of the Dallas Floodway, and generally exhibit heavy texture. The Trinity clay is a deep (typically greater than 68" to bedrock) moderately alkaline, clay soil that is typically flooded two or three times per year. Trinity clay has very slow permeability, high water capacity, slow runoff, and erosion hazard is slight (NRCS, 2011). The engineering aspects of the Trinity clay soil series include low compressive strength, low slope stability, low permeability, high shrink-swell potential, and high corrosion potential.

Fill material for the proposed project will be excavated locally and would be similar in physical and chemical characteristics to the Trinity clay soil substrate in wetlands, stream, and open water features that would receive fill. As discussed in **FEIS Section 3.5.3**, the project area is to be free of geologic and soil conditions that would be expected to constitute potentially adverse impacts, hazards, or impediments to roadway construction.

A Phase II Environmental Site Assessment was completed in the Dallas Floodway by CH2M Hill for the USACE in February 2008 (CH2M Hill, 2008). The investigation was conducted to characterize the floodplain soils near bridges and utilities and to evaluate the potential use of soils within the Dallas Floodway for levee construction. The soils were investigated in the Dallas Floodway at areas where utilities crossed the levees, along bridges, and in areas where the City of Dallas plans to create the Trinity Lakes. The investigation included the installation of 96 boring locations and collection of 192 soil samples for laboratory analysis. A total of 14 of the soil samples collected during the CH2M Hill Phase II were collected from the roadway embankment borrow sites planned for the Trinity Parkway. The analytical results were compared to the Texas Risk Reduction Program (TRRP) Tier 1 Residential Protective Concentration Levels (PCLs) for a 30-acre source area and the Texas-Specific Soil Background Concentrations (TSSBCs) for metals. According to the CH2M Hill report, concentrations of the volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) were identified in the soil samples that exceeded the most conservative TRRP PCLs (i.e., groundwater ingestion Tier 1 Residential PCL). Concentrations of metals that exceeded the groundwater ingestion Tier 1 Residential PCLs or TSSBCs for metals were identified across the Dallas Floodway. CH2M Hill stated that the metal exceedances were mostly at low concentrations and were most likely the result of anthropogenic sources through airborne deposition.

HVJ Associates, Inc. (HVJ) completed a Phase II Environmental Site Assessment for the Trinity River Bridges and Utilities project area in November 2008 (HVJ, 2008). The HVJ Phase II included the collection of 58 soil samples from 29 soil borings for laboratory analysis. The objective of the environmental investigation was to determine the presence of Resource Conservation and Recovery Act (RCRA) metals, VOCs, polynuclear aromatic hydrocarbons (PAHs), and/or pesticide affected soil within the proposed borrow areas in the Dallas Floodway. The investigation identified detectable concentrations of chemicals of concern (COC) within the borrow areas.

The City of Dallas is pursuing a Municipal Setting Designation (MSD) for the Dallas Floodway. A MSD would restrict the use of shallow groundwater beneath the Dallas Floodway and eliminate ingestion of groundwater as a potential exposure pathway. In accordance with TRRP guidelines and procedures outlined in the Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Testing Manual (USEPA/USACE, 1998), soil analytical data from the CH2M Hill and HVJ investigations were reviewed and the concentrations of COCs were compared to TRRP PCLs with a MSD (TRRP Non-ingestion PCLs), site specific background concentrations (SSBC), and Soil Ecological Benchmarks. None of the soil samples collected from the borrow areas contained concentrations of potential COCs exceeding the TRRP Non-ingestion PCLs. Only four soil samples from the dredge and fill material borrow areas contained concentrations of potential COCs exceeding the TRRP Soil Ecological Benchmarks. Localized areas within the borrow sites exceeding the Soil Ecological Benchmarks would require special handling or management in order to eliminate potential unacceptable ecological exposure. Details regarding the locations and concentrations of COCs identified in the fill and dredge areas and mitigative measures to be implemented to eliminate potential exposure to ecological receptors during future construction and operation of the roadway are included in **Section 3.5** and the attached Technical Memorandum - Trinity Floodway Borrow Area Environmental Evaluation (hereinafter 'Technical Memorandum'). Based on the absence of COCs exceeding human health PCLs and the mitigative measures identified for fill and dredge borrow areas with COCs exceeding Soil Ecological Benchmarks, adverse effects on the physical, chemical, or biological characteristics of the aquatic ecosystem are not anticipated.

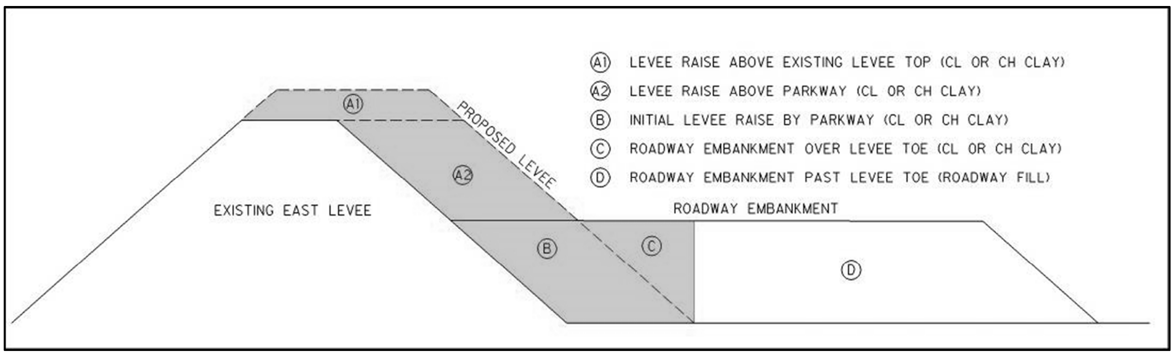
2.4.2 Source and Quantity of Material

The engineering design for the Trinity Parkway (Alternative 3C) requires its construction on an embankment with the Dallas Floodway that would protect it from the 100-year flood. This section addresses the quantities of material needed to construct the embankment for the proposed toll road and any appurtenant features. To maintain the hydraulic properties of the Dallas Floodway to ensure the safe conveyance of SPF, all embankment material must originate within the floodplain. The fill in waters of the U.S. would be a small fraction of the overall quantity of material to be excavated and moved to construct the proposed project.

Based on available geotechnical information from the USACE and NTTA, it is understood that the existing Dallas Floodway levees are comprised largely of impervious clay materials. Since the completion of the SDEIS and in response to the USACE inquiries, further studies have been conducted to characterize the geotechnical suitability of soil materials from the ten proposed borrow areas identified in **Map 3**. The soil data and analyses are documented in a 2009 Terracon geotechnical engineering report "Borrow Soil Suitability and Shrinkage Factor." The purpose of this analysis was to provide a characterization of soil materials in the borrow sites and to demonstrate an initial earthworks balance between the Trinity Parkway, the anticipated Dallas Floodway levee improvements adjacent to Trinity Parkway, and the proposed borrow excavations.

Figure G-1-15 shows the basic cross section (East Levee is shown) and soil type needs for the embankment of Alternative 3C, including the potential adjacent levee improvements planned as part of the City of Dallas/USACE Dallas Floodway Project. As noted in **FEIS Section 2.7.1.1**, future levee height raises and slope (symbolized by A1 and A2 in **Figure G-1-15**) would be based on the levee remediation plans finalized as part of the Dallas Floodway Project. Levee fill sections A1, A2, B, and C (shaded) require low permeability fill to maintain a water-tight levee. The roadway embankment (section D) can incorporate higher permeability fill. Soil in the identified borrow areas was therefore classified into two applicable categories: (i) levee useable (i.e., suitable for levee construction and, although less desirable than some other soil types, could also be used for roadway embankment); and (ii) roadway embankment useable (i.e., only suitable for roadway embankment and could not be used to raise the levees).

FIGURE G-1-15. TRINITY PARKWAY EARTHWORK SUMMARY



Notes: CH clay = expanding clay, high plasticity, and common to the area; CL clay = non-expanding clay, low plasticity, less common in the area. Potential levee raises (A1 and A2) are based on future levee remediation plans to be finalized as part of the City of Dallas/USACE Dallas Floodway Project.

The borrow quantity estimates for the 10 excavation sites are included in **Map 3**, and a summary of the earthworks analysis is provided in **Table G-1-6** for Build Alternative 3C. According to these data, the required volume of levee-usable soil was determined to be 1.32 million cubic yards (CY) (Shapes A2, B, and C as shown in **Figure G-1-15** from Hampton to the DART Light Rail Bridge). The roadway embankment-usable soil needs were determined to be 3.06 million CY (Shape D). The levee raise above the existing levee top (Shape A1) within the proposed construction limits for Alternative 3C may be done by the City of Dallas after the Trinity Parkway is built (as part of the Dallas Floodway Project). The analysis of the ten borrow sites shows that there is enough levee-usable material to fill the Alternative 3C need shown above, plus a 3.15 million CY surplus.

TABLE G-1-6. SOIL NEEDS AND BORROW VOLUMES FOR ALTERNATIVE 3C

Soil Suitability Type	Volume Needs[1] (CY: Cubic Yards)	Usable Excavation Volumes (CY)	Remainder (CY)
Levee	1.32 Million CY	4.47 Million CY	+ 3.15 Million CY
Roadway Embankment	3.06 Million CY	1.30 Million CY	- 1.76 Million CY
Total	4.38 Million CY	5.77 Million CY	+1.39 Million CY

Notes:
1. Includes 10% shrinkage for roadway (shapes C and D in **Figure G-1-15**) and 25% shrinkage for levee raise (shapes A2 and B)

As indicated above, geotechnical sampling within the Dallas Floodway demonstrates that current design for excavation areas would result in sufficient borrow material that would be suitable for constructing Alternative 3C although some soil conditioning (e.g., lime stabilization) may be necessary. Previous sampling has shown that a small portion of material within designated excavation areas would be unsuitable for use as fill for levee build-up or road embankment, such as construction debris, metal-containing fill, or miscellaneous trash. If areas of unsuitable material are detected from pre-construction geotechnical testing, such areas may be avoided or relocated within the Dallas Floodway, as appropriate. If unsuitable material is encountered during or after excavation, such material may be relocated to an over-excavated hole in the same excavation area, or removed to one of the other excavation areas where it may be used to backfill the excavation of usable material. In all circumstances where material unsuitable for construction is encountered, it would remain within the Dallas Floodway and placed in over-excavated areas to reduce surface area impacts and to avoid impacts to the hydraulic characteristics of flood protection features.

2.5 Description of Discharge Sites

2.5.1 Inventory of Aquatic Features

The Trinity River is a navigable waterway and a water of the U.S. Various studies within the project area over the past 20 years have identified and mapped jurisdictional tributaries of the Trinity River, as well as adjacent wetlands in accordance with USACE regulations and guidance, and are discussed below.

In April 1994, a wetland delineation was prepared for a Section 404 Individual Permit that was subsequently issued for the Dallas Floodway Channel Modification Project (Project No. 199300146). This earlier delineation was used as a reference and field verified in multiple field visits conducted during 1998, 1999, 2001, 2003, and 2005. Before field investigations were performed, aerial photographs, soil survey maps, and USFWS National Wetlands Inventory (NWI) maps were reviewed. Due to the large amount of available information, field verification consisted of the USACE routine determination method, as described in the 1987 Wetland Delineation Manual (USACE, 1987) in addition to the “Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Great Plains Region (Version 2.0) (USACE, 2010) and joint USACE-USEPA wetland delineation guidance (USACE-USEPA, 2007). Under USACE regulations and guidance documents, an area may be considered a wetland subject to Section 404 jurisdiction if there is adequate evidence of hydric soils, hydrophytic vegetation, and wetland hydrology within the area. The ordinary high water mark for a stream or other open water is the jurisdictional boundary for waters of the U.S., which was identified for project area open water features based on the presence of shelving and or destruction of terrestrial vegetation.

Potential waters of the U.S., including wetlands, in the project area were digitized based on year 2000 digital topographic engineering maps with a 2-foot contour interval and are listed in **Table G-1-7** and shown in **Maps 1 – 4**. A preliminary jurisdictional determination was submitted to the USACE in March 2000 and the project was assigned USACE project number SWF-2000-00308. A field survey was conducted with the USACE in April 2002 and again in February and August 2005. A proposed jurisdictional determination was submitted to the USACE in May 2006. The USACE concurred with the jurisdictional determination in a letter dated June 19, 2006. Following the expiration of the 2006 jurisdictional determination, a reverification was submitted, to which the USACE assigned project number SWF-2011-00049. The USACE concurred with the revised jurisdictional determination in a letter dated March 24, 2011. This concurrence is valid until March 24, 2016. All of the water features within the project area that were part of the approved jurisdictional determination are included in the upper portion of **Table G-1-7**. The acreage figures for several of the water features (ID Numbers 3, 14, 24, and 83) are smaller than the corresponding figures in the approved jurisdictional determination because the portion of the water feature outside the project area was excluded; the acreage for one water feature (ID Number 78) is greater than the approved jurisdictional determination because a portion of the feature is outside the limits of the jurisdictional determination but the entire feature is within the project area. In addition, **Table G-1-7** includes nine water features (each noted at the bottom of the table) for consideration as waters of the U.S., including wetlands, under a preliminary jurisdictional determination. To date, the mapping of potentially jurisdictional water features has focused on areas that may be affected by the proposed project; unmapped potentially jurisdictional water features may exist in portions of the project area that would not be affected by the proposed project (e.g., aquatic features that may be in the riparian forest areas at the southern end of the project area).

TABLE G-1-7. PROJECT AREA WATERS OF THE U.S., INCLUDING WETLANDS

ID. NO.	FEATURE TYPE/CLASS	AREA (ACRES)	LENGTH (LINEAR FEET)	FUNCTION INDEX [1]	TXRAM SCORE[1]	QUALITY RATING[2]
Water Features Included in the 2011 USACE-Approved Jurisdictional Determination						
3	Open Water - Perennial[3]	5.92	---	0.23	---	---
4	Emergent Wetland	11.83	---	0.54	58.91	medium
5	Emergent Wetland	0.20	---	0.40	55.91	low
6	Emergent Wetland	7.03	---	0.40	53.94	low
9	Emergent Wetland	4.17	---	0.45	59.50	medium
14	Emergent Wetland[3]	0.38	---	0.40	58.25	medium
15	Emergent Wetland	1.07	---	0.40	57.78	medium
16	Emergent Wetland	0.60	---	0.39	58.26	medium
17	Emergent Wetland	0.04	---	0.49	56.97	low
18	Emergent Wetland	1.45	---	0.49	60.56	medium
19	Emergent Wetland	1.66	---	0.50	57.87	medium
20	Emergent Wetland	3.73	---	0.51	60.97	medium
21	Emergent Wetland	0.08	---	0.37	58.46	medium
22	Emergent Wetland	1.42	---	0.39	57.44	medium
24	Trinity River (Perennial Stream)[3]	136.08	38,960	0.53	68.52	high
25	Emergent Wetland	2.74	---	0.48	53.16	low
26	Emergent Wetland	1.29	---	0.58	55.63	low
27	Emergent Wetland	3.98	---	0.45	57.52	medium
28	Open Water - Intermittent	0.64	1,300	0.23	---	low
29	Emergent Wetland	7.98	---	0.48	57.76	medium
30	Open Water - Intermittent	2.18	1,850	0.23	---	low
31	Emergent Wetland	11.64	---	0.62	53.95	low
32	Emergent Wetland	6.49	---	0.44	55.27	low
33	Emergent Wetland	5.19	---	0.54	58.09	medium
34	Open Water - Intermittent	3.87	1,200	0.23	---	---
35	Open Water - Intermittent	2.58	1,240	0.23	---	---
36	Emergent Wetland	20.76	---	0.70	60.38	medium
37	Crow Lake (Open Water - Perennial)	6.72	---	0.20	---	---
42	Emergent Wetland	0.53	---	0.40	53.74	low
43	Open Water - Intermittent	1.58	1,035	0.23	---	---
44	Emergent Wetland	23.82	---	0.58	58.33	medium
46	Emergent Wetland	3.28	---	0.45	57.49	medium
47	Open Water - Intermittent	1.99	935	0.23	---	---
48	Emergent Wetland	2.61	---	0.43	55.46	low
49	Open Water - Intermittent	0.87	650	0.23	---	---
50	Emergent Wetland	0.15	---	0.40	59.60	medium
51	Open Water - Intermittent	1.75	950	0.23	---	---
52	Emergent Wetland	2.42	---	0.40	57.93	medium
53	Emergent Wetland	4.24	---	0.40	58.07	medium
54	Emergent Wetland	7.95	---	0.63	58.96	medium
55	Old Trinity River Channel (Open Water)	5.44	3,500	0.35	---	---
56	Emergent Wetland	0.95	---	0.39	56.26	low
57	Open Water - Intermittent	1.65	900	0.23	---	---
58	Open Water - Intermittent	1.62	975	0.23	---	---
59	Emergent Wetland	2.03	---	0.47	60.73	medium
60	Emergent Wetland	1.70	---	0.52	60.59	medium
61	Open Water - Intermittent	1.32	725	0.23	---	---
62	Open Water - Intermittent	2.32	750	0.23	---	---
63	Open Water - Intermittent	1.39	695	0.23	---	---
65	Emergent Wetland	6.80	---	0.63	58.18	medium
66	Emergent Wetland	8.20	---	0.51	58.26	medium
67	Emergent Wetland	6.30	---	0.65	56.98	low
68	Emergent Wetland	8.88	---	0.63	56.63	low
69	Emergent Wetland	57.13	---	0.68	59.26	medium

TABLE G-1-7. PROJECT AREA WATERS OF THE U.S., INCLUDING WETLANDS

ID. NO.	FEATURE TYPE/CLASS	AREA (ACRES)	LENGTH (LINEAR FEET)	FUNCTION INDEX [1]	TXRAM SCORE[1]	QUALITY RATING[2]
70	Old Trinity River Channel (Open Water)	25.63	6,300	0.35	---	---
71	Emergent Wetland	0.86	---	0.43	54.82	low
74	Emergent Wetland	6.23	---	0.43	55.17	low
75	Emergent Wetland	2.21	---	0.46	53.42	low
76	Forested Wetland	2.77	---	1.00	70.67	high
77	Cedar Creek (Perennial Stream)	4.82	4,050	0.79	67.84	high
78	Intermittent Stream[3]	0.43	400	0.56	65.33	high
79	Old Trinity River Channel (Open Water)	1.72	2,400	0.35	---	---
80	Old Trinity River Channel (Open Water)	10.57	8,400	0.35	---	---
81	Old Trinity River Channel (Open Water)	2.80	3,375	0.35	---	---
82	Old Trinity River Channel (Open Water)	8.25	9,650	0.35	---	---
83	Old Trinity River Channel (Open Water)[3]	0.29	360	0.35	---	---
85	Emergent Wetland	1.82	---	0.39	62.61	medium
86	Emergent Wetland	0.48	---	0.52	66.78	high
87	Emergent Wetland	0.14	---	0.40	66.90	high
88	Emergent Wetland	0.07	---	0.58	64.53	medium
89	Emergent Wetland	0.07	---	0.70	67.53	high
Water Features Mapped/Included as Part of a Preliminary Jurisdictional Determination (i.e., since 2011)						
207	Old Trinity River Channel (Open Water)	0.08	64	0.35	---	---
215	Intermittent Stream	0.24	494	0.65	62.37	medium
216	Forested Wetland	0.16	---	1.00	67.59	high
217	Old Trinity River Channel (Open Water)	3.98	5,845	0.35	---	---
218	Emergent Wetland	27.82	---	0.81	56.23	medium
219	Open Water - Perennial	2.64	---	0.20	---	---
220	Open Water - Perennial	2.85	---	0.20	---	---
221	Open Water - Perennial	5.71	---	0.20	---	---
222	Trinity River (Perennial Stream)	27.71	10,145	0.53	68.52	high
	TOTAL	**548.99**	**107,048**			

Source: USACE 1995 and 2010.

Notes: ID Numbers are shown in **Maps 2** and **4**.

1. HGM refers to "hydrogeomorphic" score; TXRAM refers to Texas Rapid Assessment Method for scoring resource quality or condition. These methods for the quantitative assessment of wetlands are discussed in **Section 2.5.2**.
2. The TXRAM condition index ranges associated with the quality rating are as follows: 0.00 to 56.99 = low, 57.00 to 64.99 = medium, 65.00 to 100.00 = high.
3. The acreage for this water feature differs from the USACE-approved jurisdictional determination because either that portion of the water feature located outside the Trinity Parkway project area was excluded (ID Numbers 3, 14, 24, and 83) or a portion of the feature is outside the limits of the jurisdictional determination but within the project area (ID Number 78).

In the course of surveying the project area for aquatic features, linear drainage sumps located along the exterior perimeter of the Dallas Floodway were mapped. However, these man-made water features are not considered waters of the U.S., including wetlands, in the jurisdictional determination because these features were constructed in an upland area and do not replace any functions of the old river meanders of the Elm Fork Trinity River and West Fork Trinity River. These linear sumps outside of the Dallas Floodway are generally open water features, but some of the features include areas of emergent wetland vegetation. These man-made linear sumps are listed in **Table G-1-8** and the locations of these sumps are shown in **Maps 1**, **2**, and **4**, but are not further discussed in this analysis. In contrast, drainage sumps that are portions of the old Trinity River channel were classified as waters of the U.S. (i.e., open water), and included in the jurisdictional determination.

TABLE G-1-8. AQUATIC FEATURES DETERMINED NOT TO BE WATERS OF THE U.S.

ID NO.	FEATURE TYPE	AREA (ACRES)
7	Man-Made Linear Sump	7.36
8	Man-Made Linear Sump	6.07
23	Man-Made Linear Sump	12.69
38	Man-Made Linear Sump	28.29
39	Man-Made Linear Sump	7.46
40	Man-Made Linear Sump	12.79
41	Man-Made Linear Sump	4.50
45	Man-Made Linear Sump	10.51
64	Man-Made Linear Sump	1.31
72	Man-Made Linear Sump	8.17
73	Man-Made Linear Sump	1.75
TOTAL		**100.90**
Notes: ID Numbers are shown in **Maps 2** and **4**.		

Most of the wetland areas found within the project area are located in depressions or drainages between 396 and 400 feet above mean sea level (msl) on either side of the Trinity River channel. A few water features were delineated as open water instead of wetlands based on water depth and lack of emergent vegetation. Predominant types of waters of the U.S. within the project area include emergent or forested wetlands, stream channels of the Trinity River and its local tributaries, open water associated with old river channels, and other open water habitats such as drainage sumps within the Dallas Floodway. The areas covered by jurisdictional water features within the project area are summarized in **Table G-1-9**, which collectively comprise approximately 7.3 percent of the total project area (7,474 acres).

TABLE G-1-9. SUMMARY OF WATERS OF THE U.S. IN THE PROJECT AREA

AQUATIC FEATURE TYPE	AREA (ACRES)
Emergent Wetland	270.42
Forested Wetland	2.93
River or Stream Channel	169.28
Old River Channel (Open Water)	58.76
Other Open Water	47.60
TOTAL	**548.99**

2.5.2 Wetland Functions and Values

The primary function of wetlands relates to the physical, chemical, and biological attributes that are associated with wetlands. Examples of functions include dynamic and long-term surface water storage, filtration, nutrient cycling, flood flow alteration, wildlife habitat, and groundwater discharge (USACE, 1995). The term “values” may be used to describe those functions that are generally regarded as beneficial to society. These generally relate to benefits such as improvement to water quality, lessening of flood risk by reducing flood peak flow rate and volume, enhancement of the biological health for aquatic organisms as well as biogeochemical soil processes, and removal of contaminants.

2.5.2.1 Hydrogeomorphic Approach to Rating Functions

Included in **Table G-1-7** is a function rating for each aquatic feature based on a hydrogeomorphic (HGM) approach for riverine wetlands similar to that described by the USACE (1995). This methodology involved an evaluation of specific functions and influencing variables that best represent the range of wetland functions within the project area, and that could be readily identified and evaluated in the field. The following functions and associated influencing variables were considered in the HGM approach:

- <u>Dynamic surface water storage</u> - determined by frequency of overbank flow, average depth of inundation, micro-depressions, shrub/sapling density, tree density, coarse woody debris, and tree basal area;
- <u>Long-term surface water storage</u> - determined by visual observation of surface water;
- <u>Energy dissipation</u> - determined by frequency of overbank flow, micro-depressions, coarse woody debris, and tree density;

- Retention of particulates - determined by frequency of overbank flow, surface inflow, herbaceous density, micro-depressions, shrub/sapling density, tree density, coarse woody debris, and tree basal area;
- Maintenance of characteristic plant communities - determined by species composition, shrub/sapling density, tree density, canopy cover, and tree basal area; and
- Maintenance of interspersion and connectivity - determined by frequency of overbank flow, duration of inundation, ground cover, surface hydraulic connections, and contiguous cover between habitats.

The HGM approach is an assessment tool developed by the USACE which assigns an objective quantitative index of function to wetlands based on comparison of ecological characteristics (e.g., landscape setting, water source, water movement through the system) to a wetland reference standard (USACE, 1995). The HGM approach involves regional experts and agencies developing a unique model for a geographic region that is calibrated and tested before it is adopted for widespread use. In the absence of an HGM model in the USACE Fort Worth District, principles from the HGM guidebook for riverine systems (USACE, 1995) were used to provide some quantitative index of aquatic function. Prior to evaluating the functions of the areas delineated as waters of the U.S., including wetlands, a reference wetland was identified in the project area that was determined to have the highest array of functions based on the list of variables shown above. The reference wetland standards represent the highest level of function in the regional landscape and formed the basis of comparison for other wetlands in the project area. For each wetland, as well as other water features in the project area, variables were assigned a numerical index value between 0 and 1, and a final index per function was calculated. The index value presented in **Table G-1-7** is the arithmetic mean of the individual function scores. Average index ranges were then assigned a qualitative designation (i.e., low, medium, or high) to simplify the comparison of wetland and other water features.

The results of the HGM index analysis suggest the following conclusions about the functions of water features within the project area:

- Long-term surface water storage received high values because each of the wetlands demonstrates the ability to store water for long periods comparable to the reference wetland.
- Functions and condition associated with plant communities received relatively low value resulting from the lack of vegetation development (due to annual floodplain maintenance) beyond the herbaceous layer.

- The remaining functions of dynamic surface water storage, energy dissipation, retention of particulates, and habitat interspersion and connectivity had values that averaged near or just below 0.5. These middle values are the result of vegetation variables that were departures from the reference wetland combined with hydrology and geomorphology variables that were quite similar to the reference wetland.

2.5.2.2 The Texas Rapid Assessment Method

The Texas Rapid Assessment Method (TXRAM) was developed by the Regulatory Branches in the Fort Worth and Tulsa Districts of the USACE for evaluating the ecological condition of wetlands and streams (USACE, 2010). The TXRAM manual contains two separate modules, one for wetlands and one for streams. Each module describes intended use, scope, background, procedures, and guidelines for the rapid assessment of streams and wetlands. The TXRAM approach does not evaluate non-stream open water bodies. The output from TXRAM is used for calculating adverse impacts and appropriate compensatory mitigation associated with USACE authorized activities under Section 404. The application of TXRAM provides consistent methods for the assessment of wetlands and streams, and supports the integrity of data collection and comparison.

TXRAM does not focus on specific functions or societal values provided by wetlands and streams, but rather provides rapid, repeatable, and field-based methods, which generate a single overall score to represent the integrity and health of a wetland or stream. The TXRAM Wetlands Module contains 18 metrics for assessing observable characteristics of a wetland that are organized into the following five core elements: landscape, hydrology, soils, physical structure, and biotic structure. The TXRAM Streams Module contains eight metrics for assessing observable characteristics of a stream that are organized into the following four core elements: channel condition, riparian buffer condition, in-stream condition, and hydrologic condition. These metrics are scientifically-based indicators of aquatic condition selected by the USACE for use as a rapid and consistent evaluations based on field observations or a combination of field observations and analysis in the office. The metrics are scored based on the selection of the best fit from a set of narrative descriptions or numeric tables that cover the full range of possible measurement resulting from aquatic condition.

The results of the TXRAM stream and wetland condition analysis are shown in **Table G-1-7**. The TXRAM methodology indicates stream disturbances or man-made influences on the stream. To simplify the interpretation of the TXRAM condition index ratings a Quality Rating based on relative comparisons of TXRAM scores is included in **Table G-1-7**. The TXRAM score ranges associated with the three-level Quality Rating of stream/wetland condition are as follows: 0.00 to 56.99 = low, 57.00 to 64.99 = medium, 65.00 to 100.00 = high. Accordingly, relatively undisturbed water features such as Cedar Creek received a Quality Rating of high based on its TXRAM score, whereas several emergent wetland features (most disturbed) received a Quality Rating of low.

2.5.3 Descriptions of Aquatic Environments

2.5.3.1 Wetlands

Wetlands within the project area are found primarily within the Dallas Floodway and consist primarily of shallow depressions that are seasonally flooded and then dry out, becoming exposed mud flats during summer months. These areas contain a variety of emergent plant species such as water primrose (*Ludwigia peploides*), smartweed (*Polygonum* spp.), umbrella sedge (*Cyperus* spp.), flat sedge (*Carex* spp.), spikerush (*Eleocharis* spp.), and curly dock (*Rumex crispus*). When inundated with water, these depressions attract a variety of waterfowl species and are popular foraging areas for shorebirds and wading birds as the depressions dry up and the mud flats become exposed.

Downstream of the Dallas Floodway, near MLK Boulevard (i.e., extending from the DART Bridge southeasterly past the MKT Railroad track), several isolated depressions varying in depth and size are intermixed with the surrounding ash-hackberry-elm riparian forest. Within this area, two areas of forested wetland have been delineated in a preliminary jurisdictional determination and are shown in **Map 4** (sheets 14 and 15; see Map IDs 76 and 215). The riparian forest is dominated by green ash (*Fraxinus pennsylvanica*) and hackberry (*Celtis laevigata*), combined with abundant American elm (*Ulmus americana*) and cedar elm (*Ulmus crassifolia*) trees. A tree survey of the Alternative 3C ROW in 2009 reported 1,509 trees that were at least 6 inches in diameter at breast height (dbh) (Arborilogical, 2009). The forest included in the tree survey is approximately 25 acres in size, making the mature tree density approximately 60 stems per acre. Throughout this area, the forest is characterized by many water-tolerant woody species in addition to green ash and American elm, including black willow (*Salix nigra*), eastern cottonwood (*Populus deltoides*), box elder (*Acer negundo*), swamp privet (*Forestiera acuminata*), and buttonbush (*Cephalanthus occidentalis*). This riparian forest is an uneven-age woodland, which includes approximately 147 unusually large trees (i.e., at least 20 inches dbh), most of which are green ash (33 trees), hackberry and black willow (29 trees each), cottonwood (24 trees), or American elm (15 trees). Also among the larger trees is a mix of trees in excess of 3 feet dbh, which include black willow, green ash, hackberry, and white mulberry (*Morus alba*).

2.5.3.2 Trinity River Channel and Tributary Streams

The jurisdictional limits of the Trinity River extend to the ordinary high water mark of the channel, which may be defined as the line on the bank established by fluctuations of water and indicated by physical characteristics such as a clear natural line on the bank, shelving, destruction of terrestrial vegetation, presence of debris, or other appropriate means that consider the characteristics of the area. The bank-to-bank width of the ordinary high water mark of the Trinity River varies from approximately 100 to 200 feet throughout the Dallas Floodway. Associated with the river channel is a very narrow riparian buffer that consists mostly of cottonwood, black willow, American elm, hackberry, and green ash.

Downstream of the Dallas Floodway, the Trinity River generally retains its natural characteristics and has an ordinary high water mark width that varies from approximately 100 to 150 feet. Vegetation along this portion of the river is similar to the species listed above; however, the width of the riparian corridor is notably wider (1,500 to 2,000 feet). Cedar Creek is a jurisdictional tributary that enters the Trinity River between the AT&SF Railroad Bridge and MLK Boulevard. Coombs Creek, another tributary of the Trinity River, enters the western portion of the project area just south of IH-30. Coombs Creek is a perennial stream and drains into the Dallas Floodway through the west levee by a pressure sewer and outfall channel. These riparian corridors may serve as migration corridors for wildlife present within the project area.

2.5.3.3 Open Water

Open water habitats were identified on the basis of depth of inundation and lack of rooted emergent or woody vegetation. These habitats are substantially deeper than the wetland depressions and are ponded throughout most of the year. Crow Lake, located within the Dallas Floodway near Sylvan Avenue, is a particularly hard-edged open water area and contains minimal emergent vegetation. Emergent vegetation in the few open water areas east of the MKT Railroad Bridge usually consists of isolated patches of cattail (*Typha latifolia*) along the immediate shoreline. In some of the shallower shoreline areas, pondweed (*Potamogeton* spp.) and spikerush are common.

Stormwater runoff is conveyed through the Dallas Floodway to the Trinity River by several pump stations located along each levee. Stormwater is directed through steep-sloped channels aligned perpendicular to the levee and the river channel. These channels were classified as intermittent open waters in the jurisdictional determination of waters of the U.S. within the Dallas Floodway. As flood levels recede, these channels usually drain entirely with the exception of a few isolated pools. Black willow and cottonwood saplings represent the primary plant species that have become established on the steep side slopes of these channels. Isolated pools that remain after floodwaters recede may provide foraging opportunities for a variety of heron or egret species.

2.6 Construction Activity Related to Fill Material

The type of disposal methods will depend on the type of construction that is undertaken at a specific location. The proposed project would cross smaller channels through the use of various-sized concrete box culverts, while larger drainages would be bridged. Depending upon the drainage geometry at alignment crossings, some channel modification may be necessary along certain drainages, although this would be a relatively infrequent occurrence and avoided if at all practicable. The following sections describe the general methods, which would be used for the different alternatives to construct the new road embankment, construct a bridge or culvert, or excavate borrow material in the vicinity of surface waters and wetlands.

2.6.1 New Road Embankment

The construction of new road embankment in the Dallas Floodway results in the placement of fill in waters of the U.S., including wetlands. Aquatic features affected by embankment fill would be encountered in proximity to the levees. The fill material would be placed in the various aquatic areas with the use of large earth-moving and excavating equipment. The material would be from nearby source (borrow) pits or excess material from other areas in the floodplain area. The fill would be necessary to construct the proper side slopes and to adjust the elevation of the roadway.

2.6.2 Bridge and Culvert Construction

Alternative 3C would cross water features within the project area using bridges or concrete box culverts. Although the use of bridges would likely minimize impacts to wetlands and aquatic areas, bridge construction may require placement of fill material, such as dirt, concrete, or bridge pillars within jurisdictional areas. In addition to potential fill areas, construction of the roadway and bridges may result in temporary or permanent impacts to wetlands by removing vegetation, excavating and/or compacting soils, and changing the hydrology of the immediate area. Precautions would be taken to avoid unnecessary impacts during construction. Where feasible, bridges would be built such that the abutment footings would be outside of active stream channels, effectively spanning the water body. Some bridge piers and abutment footings may use driven piling or drilled shafts, which would result in minimal disturbance to the streambed and banks. Culvert construction would also require excavation in the streambed or wetland to lay the pipe or box culvert.

In some instances it would be necessary to isolate construction activities from the stream channel (or other aquatic feature) by the use of cofferdams or drilled shafts. Cofferdams are temporary structures, which are constructed in the streambed and enclose the construction activities. Once in place, water trapped within the dam is pumped out to expose the creek-bed and facilitate the excavation and construction activities. The excavated materials and pumped water from within the cofferdams would be transferred to a temporary settling pond to remove the sediment. The sediment would be disposed of in proper locations and the water would be returned to the stream.

The locations of cofferdams, temporary settling ponds, sediment disposal sites, and return water to the stream would be determined during final design and pre-construction coordination. As detailed in **Section 3.5** and the attached Technical Memorandum, environmental testing data from the CH2M Hill and HVJ Phase II site investigations indicate that material from the proposed borrow areas required for construction of Alternative 3C does not contain concentrations of potential COCs exceeding TRRP Non-ingestion PCLs. Four soil samples collected from the borrow sites contained concentrations of COCs exceeding the Soil Ecological Benchmarks and/or SSBCs established for the area. These localized areas would require special handling or management in order to eliminate potential unacceptable ecological exposure. Re-use of fill containing COCs above ecological benchmarks would be limited to the core of the roadway embankment (i.e., re-used as subsurface soil) thus eliminating potential future ecological exposure. The use of contaminated sediment would be avoided and clean fill would be used during construction of any temporary cofferdams and settling ponds.

2.6.3 Borrow Material Excavation

Loss of waters of the U.S., including wetlands, would also occur through the excavation of borrow areas identified in **Maps 3** and **4**. The end-product will be an excavated depression that is designed to drain toward the Trinity River, but the construction means and methods (i.e. large earth moving equipment) would occur in a manner so as to be considered a fill activity. The potential exists that borrow area excavation may occur below the water table, or that surface runoff and overbank flooding may flood the excavation areas before they are completed. Under these circumstances, dewatering will be addressed in a manner consistent with the process described in **Section 2.6.2**.

2.7 Potential Impacts to Aquatic Features

Waters of the U.S., including wetlands, in the project area would be affected by the various construction activities discussed in **Section 2.6**. As previously mentioned, **Sections 2.3.3** and **2.3.4** reported information developed to a comparable level of detail from the SDEIS and LSS; however, the design of Alternative 3C was subsequently developed to a higher level of detail. The information presented below regarding the expected environmental impacts of this alternative reflects updated information based on the design refinements. Potential impacts of the proposed project have been assessed separately for fill attributable to road construction (i.e., ROW fill) and excavation areas. This is due to the fundamentally different nature of aquatic feature fill from roadway construction as opposed to impacts to water features as the result of excavation activities.

The potential impacts to waters of the U.S., including wetlands, for Alternative 3C are presented in **Table G-1-10**; this table excludes project area water features previously listed in **Table G-1-7** that would not be affected by the proposed project. Impacts to aquatic features are considered "potential" for many of the water features because acreage impacts have been assessed based on the overlap of roadway ROW or excavation areas with water features. However, during final project design the actual fill impacts to a water feature may be substantially reduced, such as in the case of water features located below bridges or ramps that are elevated above ground level. In such cases the impacts to waters of the U.S., including wetlands, would be limited to the relatively small areas required for bridge support columns; the map ID for such aquatic features that would be largely bridged over are noted in **Table G-1-10** by an asterisk. A summary of the potential impacts arranged by the type of water feature is shown in **Table G-1-11**.

TABLE G-1-10. POTENTIAL IMPACTS TO WATERS OF THE U.S.

Map ID Number[1]	Feature (Type/Class)	Function Index[2]	TXRAM Score[2]	Quality Rating[2]	Potential Impacts (acres)[3]	
					ROW Fill	Excavation
9	Emergent Wetland	0.45	59.50	medium		0.13
16	Emergent Wetland	0.39	58.26	medium	--	0.60
17	Emergent Wetland	0.49	56.97	low	--	0.04
18	Emergent Wetland	0.49	60.56	medium	--	1.45
19	Emergent Wetland	0.50	57.87	medium	--	1.66
20	Emergent Wetland	0.51	60.97	medium	--	0.91
21	Emergent Wetland	0.37	58.46	medium	--	0.08
24	Trinity River (Perennial Stream)	0.53	68.52	high	3.67	2.80
25	Emergent Wetland	0.48	53.16	low	--	1.64
26	Emergent Wetland	0.58	55.63	low	--	1.29
27	Emergent Wetland	0.45	57.52	medium	--	0.15
29*	Emergent Wetland	0.48	57.76	medium	0.31	--
31*	Emergent Wetland	0.62	53.95	low	1.56	--
32*	Emergent Wetland	0.44	55.27	low	2.53	--
33	Emergent Wetland	0.54	58.09	medium	0.69	--
34*	Open Water - Intermittent	0.23	---	---	0.79	--
35*	Open Water - Intermittent	0.23	---	---	1.27	--
46	Emergent Wetland	0.45	57.49	medium	1.56	--
47*	Open Water - Intermittent	0.23	---	---	0.64	--
48	Emergent Wetland	0.43	55.46	low	0.28	--
49	Open Water - Intermittent	0.23	---	---	0.14	0.64
50	Emergent Wetland	0.40	59.60	medium	--	0.15
51	Open Water - Intermittent	0.23	---	---	0.33	0.88
52	Emergent Wetland	0.40	57.93	medium	0.02	1.25
54	Emergent Wetland	0.63	58.96	medium	2.34	3.03
59	Emergent Wetland	0.47	60.73	medium	1.19	0.15
62	Open Water - Intermittent	0.23	---	---	1.44	--
65	Emergent Wetland	0.63	58.18	medium	--	0.33
66	Emergent Wetland	0.51	58.26	medium	7.97	--
67	Emergent Wetland	0.65	56.98	low	--	3.22
68	Emergent Wetland	0.63	56.63	low	--	4.33
69	Emergent Wetland	0.68	59.26	medium	--	10.12
70*	Old Trinity River Channel	0.35	---	---	0.51	--
71	Emergent Wetland	0.43	54.82	low	0.54	--
76*	Forested Wetland	1.00	70.67	high	1.24	
78*	Intermittent Stream	0.56	65.33	high	0.09	--
80*	Old Trinity River Channel	0.35	---	---	0.23	--
85	Emergent Wetland	0.39	62.61	medium	--	0.73
215*	Intermittent Stream	0.65	62.37	medium	0.15	
216*	Forested Wetland	1.00	67.59	high	0.16	
222	Trinity River (Perennial Stream)	0.53	68.52	high	0.32	--
TOTAL IMPACTS (acres)					**29.97**	**35.58**

Notes:

1. Map ID numbers correspond to the locations shown in **Maps 2** and **4**.
2. For derivation of wetland Function Index (i.e., HGM Score), TXRAM Score, and Quality Rating (three-level relative ranking based on TXRAM Score), see discussion in **Section 2.5.2**.
3. Calculated areas are estimates only and may change as final configuration is refined. ROW fill impacts are expected from roadway construction; excavation impacts are expected from potential borrow areas. Expected impacts are based on the jurisdictional determination approved by USACE on March 24, 2011(File # SWF-2011-00049) and subsequent preliminary jurisdictional determination surveys.

* Potential impacts to this water of the U.S., including wetlands, may occur from bridge column construction and would likely be substantially reduced or eliminated during final design.

TABLE G-1-11. SUMMARY OF POTENTIAL IMPACTS TO AQUATIC FEATURES

AQUATIC FEATURE TYPE	POTENTIAL FILL IMPACTS (ACRES)*		
	ROW FILL	EXCAVATION	TOTAL
Emergent Wetland	18.99	31.26	50.25
Forested Wetland	1.40	0	1.40
River or Stream Channel	4.23	2.80	7.03
Old River Channel (Open Water)	0.74	0	0.74
Other Open Water	4.61	1.52	6.13
TOTAL	**29.97**	**35.58**	**65.55**

Notes:
* Calculated areas are estimates only. ROW fill impacts are expected from roadway construction; excavation impacts are expected from potential borrow areas (see **Maps 3** and **4** for borrow area locations). Potential impacts to waters of the U.S., including wetlands, may occur from bridge column construction and would likely be substantially reduced or eliminated during final design.

Losses to waters of the U.S., including wetlands, are predominantly associated with a number of emergent wetland depressions that are dry during portions of the year. Alternative 3C would also impact, to a lesser degree, portions of seasonally flooded areas, intermittent stream, perennial stream, and forested wetland features. The proposed roadway would cross smaller stream channels through the use of various-sized concrete box culverts, while larger drainages would be bridged. Depending upon the topography at alignment crossings, channel modification may be necessary along certain drainages, although this would be a relatively infrequent occurrence and avoided if at all practicable. The impacts shown in **Tables G-1-10** and **G-1-11**, and discussed herein, account for any channel modification that may be necessary. As designed, Alternative 3C would require excavation and earthwork activities that would result in modification of the existing Trinity River channel. This channel modification is necessary due to the very narrow floodplain area between the Trinity River and the East Levee between the IH-35E bridges and Corinth Street (see **Map 4**, Sheets 12 and 13). That is, design constraints required for the protection of the East Levee preclude moving the proposed toll road any closer to the toe of the levee, thus requiring a riverside retaining wall that would extend into the existing Trinity River pilot channel. The proposed borrow plan for roadway embankment involves excavation of a secondary channel within the west overbank in this area for a distance of approximately 2,900 feet that is needed for hydraulic mitigation. The secondary channel would begin approximately 1,000 feet downstream of the northbound IH-35E bridge and transition back into the existing channel just upstream of the Corinth Street bridge, and would be excavated to the same approximate depth as the existing Trinity River channel. Discussion regarding how this proposed element of the project may affect river flow patterns and bank stability is included in **Section 3.1.3.1**.

As noted above and detailed in **Section 3.5** and in the attached Technical Memorandum, environmental testing data from the CH2M Hill and HVJ Phase II site investigations indicate that material from the proposed borrow areas required for construction of Alternative 3C does not contain concentrations of potential COCs exceeding TRRP Non-ingestion PCLs. Environmental testing data indicate that only localized areas within the borrow sites contained concentrations of COCs exceeding the Soil Ecological Benchmarks and/or SSBCs established for the area. Re-use of borrow from these localized areas exceeding the Soil Ecological Benchmarks or SSBCs would require special handling or management in order to eliminate potential unacceptable ecological exposure. Re-use of fill containing COCs above Ecological Benchmarks would be used within the core of the roadway embankment (i.e., re-used as subsurface soil) thus eliminating potential future ecological exposure. The use of contaminated sediment would be avoided and clean fill would be used during channel modifications in waters of the U.S.

As noted in **Section 2.5.2**, waters of the U.S., including wetlands, in the project area provide a wide range of functions, with each level of function dependent on a range of variables. The level of wetland function shares a relationship with wetland condition, which is also addressed in **Section 2.5.2**. The most recognizable function that would be affected is that of long-term surface water storage, which is dependent on the ability of the waters of the U.S., including wetlands, to receive and retain water for an extended period during the growing season. The information in **Table G-1-10** repeats earlier information used to characterize the function and condition of aquatic features.

In many instances, excavation areas and roadway fill areas within the ROW would not include the entire delineated area of an emergent wetland. These partially filled or excavated wetlands were examined to determine whether actions during construction could be taken to preserve the functions of the remaining wetland areas. In most instances involving partial excavation of an emergent wetland, it was determined that the primary function of long-term surface water storage could be maintained by creating a new shelf along the wetland edge near the exaction area to prevent drainage. As the principal source of water for most emergent wetlands within the Dallas Floodway is occasional overflow of stream banks by the Trinity River, then replacing the edge of a wetland depression would be expected to preserve the hydrologic regime in most cases. For these wetland remnants, it was considered that preservation of the hydrologic function of the wetland would also generally preserve other functions that may be performed by the wetland. However, in those instances where the remnant wetland was very small (i.e., typically less than 0.01 acre) or an upslope source of water would be severed by excavation, then such wetland areas were included as part of wetland impacts in the calculations shown in **Table G-1-10**.

The Dallas Floodway is regularly mowed, which is necessary to maintain flood conveyance capabilities. In doing so, the required maintenance mowing of the Dallas Floodway prevents the development of riverine emergent wetlands into forested riverine wetlands. This influence on wetland condition limits the ability of the wetlands to function in general, and lack of structural and species diversity (i.e., condition) affects the ability of the wetland to function as wildlife habitat. Whereas the loss of the long-term surface water storage function may be more recognized, losses of aquatic function associated with vegetation characteristics (e.g., vegetation communities, interspersion, and connectivity) are comparatively low.

Loss of other familiar aquatic functions such as dynamic surface water storage, energy dissipation, and particulate retention would occur at an intermediate level. Unlike long-term water storage and habitat associated functions, these functions are affected by multiple variables. The effect is that where a particular wetland is lacking in a certain variable, other variables exist that compensate and increase the level of function for a particular wetland. Furthermore, depending on the function, some variables are weighted more than other variables, which tend to mask the effect of deficient variables.

In summation, various wetland functions would be affected by Alternative 3C. The quality of affected waters of the U.S., including wetlands range from low to high; however, collectively the impacts would be weighted towards medium quality waters of the U.S., including wetlands.

Where possible, the project would avoid impacting waters of the U.S., including wetlands, outside the Alternative 3C ROW. Disturbed areas would be treated with native grass seeding, mulching, erosion blankets, or similar erosion preventative measures to provide temporary soil stabilization until natural vegetation becomes re-established.

The FHWA-recommended alternative has the potential to affect each of the listed aquatic functions described above. Many of these functions depend on variables such as frequency of overbank flooding, vegetative diversity at both the structural and species richness level, and topographic variability. Non-target aquatic features adjacent, upstream, or downstream of the project would retain these characteristics and there would be no expected effect on their functional capability or condition.

As the proposed project is completed, the potential exists for indirect impacts that could affect the functional capability and condition of non-target aquatic features. Most notably, the creation of several miles of roadway within the Dallas Floodway would generate increased runoff that could result in some erosion and sedimentation of areas downstream of the proposed project. Such processes could affect the vegetative composition or topographic variability on non-target waters, which could have a subsequent effect on the types of the functions and conditions described above. In light of this, implementation of post-construction BMPs and an adequate compensatory mitigation plan should effectively minimize indirect impacts to non-target waters of the U.S., including wetlands, from localized erosion. As pointed out above (**Table G-1-10**), the proposed project would bridge over several aquatic features such that the actual fill of the aquatic feature may be avoided or greatly reduced, even though the full acreage of overlap has been assessed as an impact. Consideration was given as to whether secondary impacts would likely occur due to shading of aquatic features from sunlight needed for plant growth. In light of the general west-east orientation of the proposed bridges and the path of the sun during the growing season, shading from bridges and ramps (i.e., on the levee side of the structures) is expected to only extend a short distance to the north side of these structures. Thus, much of the shaded areas would not affect wetlands, which would be located either directly below such structures or to the south of them. Additionally, most of the aquatic features crossed by bridges/ramps are open water features, which would not be expected to be substantially harmed by shading. In light of the foregoing, the full assessment of impacts for the aquatic features beneath bridges/ramps would have the effect of addressing secondary impacts to the natural environment that is proximate to such structures (e.g., habitat fragmentation, physical disturbance of habitat, and general degradation of habitat). In summary, although it is difficult to precisely quantify the amount of secondary impacts to aquatic features, such considerations would be factored into the mitigation ratios used by the USACE in assessing the acreage of compensatory mitigation for the types/quality of habitat affected by the proposed project (see discussion in **FEIS Appendix G-3, Section 4.0**).

3.0 AQUATIC ECOSYSTEM EFFECTS ANALYSIS

This section analyzes the effects of Build Alternative 3C, described generally in **Section 2**, in terms of various dimensions of the aquatic ecosystem as required by 40 CFR Part 230, Subparts C through G. The discussion of efforts to avoid or minimize impacts to aquatic resources (40 CFR Part 230, Subpart H) and compensatory mitigation for unavoidable impacts (40 CFR Part 230, Subpart J) are included in **FEIS Appendix G-3**. The Trinity River within the project area is a historically degraded reach of the river whose local ecosystem is truncated by levees and a history of disturbance and development. The ongoing mowing and maintenance of the levees and floodplain floor in the Dallas Floodway effectively precludes the development of a natural riparian corridor with high vegetative diversity within available upland and aquatic habitats. The biological communities within the Dallas Floodway are challenged by myriad influences of the highly urbanized areas on the landside of each levee. The constant influx of surface water runoff from the commercial, industrial, and residential areas into the water bodies contributes to a generally degraded condition for aquatic and terrestrial ecosystems. The ongoing maintenance of the floodway, principally mowing, is also a contributor to the suppression of biodiversity in the area.

The analysis in this section examines the characteristics of aquatic systems that have been identified in the floodway and vicinity. As the project area encompasses some 7,474 acres, the characteristics of this large scale project and potential impacts discussed in these sections are based on field observations and available literature of the maintained floodway, which include field and/or laboratory testing performed by others and information from Internet sites.

In connection with the treatment of various topics discussed, the secondary or indirect impacts of the proposed project on aquatic ecosystems are identified, as appropriate. Indirect impacts are defined as “the effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material” (40 CFR Section 230.11(h)). Such impacts are caused by a proposed project but occur after construction is completed and/or are located away from the project’s construction footprint. For the proposed Trinity Parkway, potential indirect impacts to the aquatic ecosystem include the following:

- Increased localized runoff due to the creation of impervious roadway surfaces by the proposed project;
- During and shortly after construction of the project, an increase in sedimentation of aquatic resources, including wetlands, and decreased water quality away from the construction footprint; and
- Loss of wildlife habitat and decreased habitat function in areas away from but near the proposed project’s construction footprint.

Indirect impacts to aquatic resources could also result from the O&M of the Trinity Parkway, as well as from secondary land development if such were to occur; however, as discussed in detail in **FEIS Section 4.25**, the nature of the proposed project and market influences independent of the Trinity Parkway are such that project-induced land use change is expected to be negligible. As a direct effect of the project, vegetation communities would be affected on a landscape scale by fragmentation (in areas where no roadways currently exist) and loss of habitat continuity. These types of impacts may affect the processes and functions of communities including seed dispersal, reproductive activities, and the cycling and transfer of nutrients.

Past development in the project area has resulted in loss of natural habitats through residential, commercial, and industrial development, habitat fragmentation from infrastructure construction or changes in land use, and disruption of fish and wildlife populations. Future development in the DFW region, whether from transportation improvements or commercial/residential development, is expected to contribute to cumulative effects upon the region's remaining natural resources (i.e., wetlands, water resources, and biological resources).

3.1 Aquatic Ecosystem Physical/Chemical Characteristics (Subpart C)

3.1.1 Substrate

3.1.1.1 Placement of Dredged/Fill Material

The proposed project would involve a change to surface topography of waters of the U.S., including wetlands, due to excavation and redepositing of material across the project area. The vast majority of soil material removed from the floodplain, including waters of the U.S., would be excavated by mechanical excavators and loaded into trucks to be hauled to the road embankment construction area. Approximate distance of movement would vary between construction staging areas. The excavated material may be moved in almost any direction from the initial point of excavation. However, the strategic location of construction haul roads would serve to minimize these distances for operational efficiency and to avoid the disturbance or compaction of soil in non-target waters of the U.S., including wetlands, where possible.

Fill or excavation activities associated with the proposed project would for the most part occur in aquatic resources that would be eliminated during the construction process. Potential impacts from the dispersion of fill material should be minimal as aquatic resources impacted by construction activities are primarily associated with periodically inundated wetlands, which may be dry for portions of the year. Secondary impacts such as sedimentation and increased turbidity may be decreased through the proper implementation and maintenance of best management practices (BMPs) during construction. Such measures should further reduce the risk for dispersion of earthen material in the excavation areas adjacent to the Trinity River Channel.

The location of temporary access roads required for construction would be determined during final design and pre-construction coordination. Fill material from the proposed borrow areas would be used for construction of the embankment for the Trinity Parkway. Phase II Environmental Site Investigations were conducted by CH2M Hill and HVJ to develop data required to characterize soils in the Dallas Floodway. The results of the environmental testing are detailed in **Section 3.5** and the attached Technical Memorandum**.** Evaluation of the Dallas Floodway soil data indicated that the identified COCs are widely distributed within the Dallas Floodway and may be considered anthropogenic background for the area with the exception of isolated areas containing elevated concentrations of COCs that were identified during the Phase II investigations. Discharge of contaminants from the localized areas containing elevated concentrations of COCs would be controlled during project construction through specialized handling and management procedures. Fill material containing elevated concentrations of COCs will be re-used in the core of the roadway embankment and encapsulated with unaffected borrow material. Re-use of fill material from the proposed borrow sites is not expected to adversely effect water quality or result in exposure of contaminants to ecological receptors, The use of contaminated sediment would be avoided and clean fill would be used for construction of temporary access roads.

3.1.1.2 Physical Effects on Benthos Invertebrates/Vertebrates

Immediate impacts to the benthic community would be experienced as the fill within wetlands and other aquatic habitats would effectively bury the existing benthic communities. Additionally, construction activities could cause localized increases in suspended sediments to non-target areas resulting in the eventual burying of the associated benthic communities. Benthic communities would be permanently impacted in areas of new fill. Over time, it is expected the benthic communities would eventually be reestablished in slightly disturbed areas, as well as the hydraulic mitigation areas, thereby resulting in only short-term localized secondary impacts.

The implementation and maintenance of BMPs would control erosion and sedimentation to avoided off-site resources downstream and reduce secondary impacts. It is possible, however, that limited amounts of sediment may escape during major precipitation events as the project is constructed and final landscaping measures become established.

Approximately 13.9 acres of open water/river channel and associated benthic communities are expected to be impacted directly by fill/excavation. In addition to these direct impacts, available environmental testing data for the proposed borrow areas was reviewed to evaluate potential impacts further, due to the scale of proposed earthworks and the potential susceptibility of benthic communities to contaminants. As noted above and detailed in **Section 3.5** and in the attached Technical Memorandum, environmental testing data from the CH2M Hill and HVJ Phase II site investigations indicate that material from the proposed borrow areas required for construction of Alternative 3C does not contain concentrations of potential COCs exceeding TRRP Non-ingestion PCLs. Environmental testing data indicate that only localized areas within the borrow sites contained concentrations of COCs exceeding the Soil Ecological Benchmarks and/or SSBCs established for the area. Re-use of borrow from these localized areas exceeding the Soil Ecological Benchmarks or SSBCs would require special handling or management in order to eliminate potential unacceptable ecological exposure. Re-use of fill containing COCs above Ecological Benchmarks would be used within the core of the roadway embankment (i.e., re-used as subsurface soil) thus eliminating potential future ecological exposure. The use of contaminated sediment would be avoided and clean fill would be used during channel modifications in waters of the U.S.

3.1.2 Water Quality

3.1.2.1 Suspended Particulates and Turbidity

The Trinity River Watershed upstream of the project area is highly urbanized within the DFW area and is predominantly agricultural and rangeland elsewhere. The level of urbanization within the watershed can have varied and profound effects on water quality. Urban stormwater runoff carries pollutants from many sources including automobiles, oil and grease on roads, atmospheric deposition, processing and salvaging facilities, wastewater effluent, chemical spills, pet wastes, industrial plants, construction site erosion, and the disposal of chemicals used in homes and offices. As an urban water body, the Trinity River inherits some problems with water quality from upstream, notably sediment, nutrients, and pesticides from non-point sources (e.g., nutrient enriched return flow from wastewater treatment plants upstream). Also, as noted above, the Trinity River as it passes through the Dallas Floodway receives the inflow from storm sewers from highly urbanized areas, which would be expected to contain a variety of pollutants, including bacteria, oil and grease, heavy metals, toxic substances, and trash and debris. In the DFW area, challenges to water quality are linked to the use of pesticides, insecticides, and fertilizers for agricultural operations upstream, as well as point and non-point discharges from industrial and urban areas (USGS, 1998).

The Texas Commission on Environmental Quality (TCEQ) evaluates water bodies in the state and identifies in its biennial *Texas Integrated Report for CWA Sections 305(b) and 303(d)* (hereinafter "*Texas Integrated Report*") those water bodies that do not meet uses and criteria defined in the *Texas 2010 Surface Water Quality Standards* (TSWQS) (TCEQ, 2010). The TCEQ publishes in its *Texas Integrated Report* the Texas Water Quality Inventory and 303(d) List for the state. This portion of the report describes the status of water quality in all surface water bodies of the state that were evaluated for a given assessment period. The 2012 *Texas Integrated Report* was approved by the USEPA on May 9, 2013 (TCEQ, 2013a) and contains water quality information relevant to the project area.

Periodic water sampling is conducted throughout the state and each water body sampled is placed into one of five categories as part of a strategy for overall management of water quality. The categories indicate the status of water quality in a given stream segment as defined in the TSWQS. Of particular interest for the proposed project is the water quality status 5a, because it characterizes the sampled water bodies in the project area. This category means the TSWQS is not met for one or more parameters and that a quantitative plan is required to determine the amount of a particular pollutant that a water body can receive and still meet its applicable water quality standards (i.e., Total Maximum Daily Load (TMDL)). Each water body segment subject to periodic sampling is further identified by the individual stream reach with at least one impaired use. Each of these reaches is termed an Assessment Unit (AU) and designated water use categories identified by the TCEQ in the 2012 *Texas Integrated Report* include the following:

- Aquatic Life Use
- General Use
- Recreation Use
- Fish Consumption Use
- Oyster Waters Use
- Public Water Supply Use

The project area includes State Stream Segment 0805 (Upper Trinity River) which extends throughout the project area's length (TCEQ, 2011). As defined in the TSWQS and *Texas Integrated Report*, this segment extends 97.3 miles from a point immediately upstream of the confluence of the Cedar Creek Reservoir discharge canal in Henderson County/Navarro County northward to a point immediately upstream of the confluence of the Elm Fork Trinity River in Dallas County. As part of the 2012 *Texas Integrated Report*, Stream Segment 0805 has been subcategorized into the following five AUs (listed in sequence from downstream to upstream):

- 0805-01 – From the confluence of the Cedar Creek Reservoir discharge canal upstream to the confluence of Smith Creek (33.3 miles);
- 0805-02 – From the confluence of Smith Creek upstream to the confluence of Tenmile Creek (30.3 miles);
- 0805-03 – From the confluence of Fivemile Creek upstream to the confluence of Cedar Creek (10.6 miles); and
- 0805-04 – From the confluence of Cedar Creek upstream to the confluence of Elm Fork Trinity River (7.8 miles); and
- 0805-06 - From the confluence of Tenmile Creek upstream to the confluence of Fivemile Creek (15.3 miles).

Within the project area, AU 0805-04 extends from just east of the project area to downstream of the Santa Fe Trestle Trail, connecting with AU 0805-03, which extends farther downstream.

As part of the 2012 *Texas Integrated Report*, the TCEQ has identified a "Level of Support" based on several measured parameters (i.e., pollutants or adverse physical/chemical conditions) for each designated use category associated with each AU (TCEQ, 2013a). The extent to which designated uses for the water body are supported by water quality as determined from sample testing (i.e., Level of Support) is provided in **Table G-1-12**; although the results from testing multiple samples are provided in the *Texas Integrated Report*, only the least favorable sampling result is shown. For comparison purposes, **Table Gk-1-12** also includes data for the two stream segments located immediately upstream of Segment 0805 (Segments 0822 and 0841). This information is included because water from these two segments flows into Segment 0805, thereby establishing the baseline for water quality conditions in the project area. The designated use "Oyster Waters Use" is not included in the table because it does not apply to any of the AUs within or near the project area.

TABLE G-1-12. WATER QUALITY SUPPORT FOR DESIGNATED USES

Stream Segment -AU	Aquatic Life Use	Recreation Use	General Use	Fish Consumption Use	Public Water Supply Use	AU Category[1]
0805 (Upper Trinity River)						**5a**
0805-01	Not Assessed	Not Reported	Concern[2]	Not Supporting	N/A	5a
0805-02	No Concern	Fully Supporting	Concern[2]	Not Supporting	N/A	5a
0805-03	No Concern	Not Supporting	Concern[2]	Not Supporting	N/A	5a
0805-04	No Concern	Not Supporting	Concern[2]	Not Supporting	N/A	5a
0805-06	Not Assessed	Fully Supporting	Concern[2]	Not Supporting	N/A	5a
0822 (Elm Fork Trinity River Below Lewisville Lake)						**2**[3]
0822-01	Concern[2]	Fully Supporting	Concern[2]	Fully Supporting	No Concern	N/A[3]
0841 (Lower West Fork Trinity River)						**5a**
0841-01	No Concern	Not Supporting	Concern[2]	Not Supporting	N/A	5a

Source: TCEQ, 2013a.
Abbreviation used in Table: N/A = Not Applicable
Notes:
1. Individual AUs are assigned to categories and, based on given parameters, it is then decided whether or not that particular AU is supportive of a particular use. These determinations are then used to assign a category to the entire stream segment.
   Category 5a = A Total Maximum Daily Load (TMDL) assessment is either underway, scheduled, or will be scheduled.
2. Concern for screening levels for one or more measured parameters.
3. This stream segment is shown as Category 2, but the category for the AU is not specified in the 2012 *Texas Integrated Report*.

As indicated in **Table G-1-12**, AU 0805-03 and AU 0805-04 (the areas of Stream Segment 0805 within the project area) are "Not Supporting" for recreation and fish consumption uses. These AUs (as well as downstream AUs 0805-01, 0805-02, and 0805-06) have led to the overall TCEQ designation of Stream Segment 0805 as a "Category 5a" stream segment. This means that the water body does not meet applicable water quality standards or is threatened for one or more designated uses by one or more pollutants, and that a TMDL is either underway, scheduled, or will be scheduled. Since Section 303(d) of the CWA requires the TCEQ to identify water bodies for which effluent limitations are not stringent enough to implement water quality standards, Stream Segments 0805and 0841 are included on the Section 303(d) List in the 2012 *Texas Integrated Report* (TCEQ, 2013a). The specific reasons for listing the various AUs discussed above are summarized in **Table G-1-13**; this table indicates the sampled parameter (i.e., pollutant) that screening procedures identified as exceeding water quality standards.

TABLE G-1-13. REASONS FOR INCLUSION IN THE 2012 SECTION 303(D) LIST

Stream Segment-AU	Designated Use	Parameter Identified for Placing on Sec. 303(d) List
Segment 0805 (Upper Trinity River)		
0805-01: From confluence of Cedar Creek Reservoir discharge canal confluence of Smith Creek (33.3 miles)	Fish consumption	Dioxin in edible tissue PCBs in edible tissue
0805-02: From confluence of Smith Creek to confluence of Tenmile Creek (30.3 miles)	Fish consumption	Dioxin in edible tissue PCBs in edible tissue
0805-03: From confluence of Fivemile Creek to confluence of Cedar Creek (10.6 miles)	Fish consumption	Dioxin in edible tissue PCBs in edible tissue
	Recreation	Bacteria
0805-04: From confluence of Cedar Creek to confluence of Elm Fork Trinity River (7.8 miles)	Fish consumption	Dioxin in edible tissue PCBs in edible tissue
	Recreation	Bacteria
0805-06: From confluence of Tenmile Creek to confluence of Fivemile Creek (15.3 miles)	Fish consumption	Dioxin in edible tissue PCBs in edible tissue
0822 (Elm Fork Trinity River Below Lewisville Lake)		
0822-01: Lower 11 miles of segment	This AU is not on the Section 303(d) List.	
Segment 0841 (Lower West Fork Trinity River)		
0841-01: From confluence of Elm Fork Trinity River to the Tarrant/Dallas county line	Recreation	Bacteria
	Fish consumption	Dioxin in edible tissue PCBs in edible tissue
Source: TCEQ, 2011 and 2013a. **Abbreviations used in Table:** PCBs = polychlorinated biphenyls.		

Erosion and sedimentation are short-term issues associated with the proposed project. The potential for erosion and sedimentation is accelerated when vegetation is cleared in preparation for the construction of the roadway. The proposed project requires the crossing of several water bodies, including the Trinity River and its network of drainage sumps and tributaries; the potential exists for a temporary increase in suspended solids and turbidity during project construction. In addition, bridge construction has the potential to create soil erosion, which likewise could temporarily increase suspended particulates and turbidity both in the project area and downstream of the project area. Increases in suspended particulate and increased turbidity during the construction and operation phase of the Trinity Parkway could reduce light penetration thereby limiting the growth of aquatic plants and reducing visibility for aquatic wildlife. This effect would be relatively short in duration, as the particulates should settle rapidly. Gross litter accumulation would have the same effect for plant and wildlife species, and could be of longer duration.

Although the potential exists for incidental suspension of particulates from erosion, most of the fill and excavation activities during construction are associated with periodically inundated wetlands. As such, any increase in suspended particulates and turbidity would be temporary in nature and suspended particulates would be expected to shortly settle. Furthermore, any subsequent adverse effects on biological factors such as light penetration or dissolved oxygen would also likely be minimal.

For perennial water bodies, potential impacts from sedimentation and solids suspension may reduce light penetration for plant growth, alter geomorphology and in-stream habitat, cover benthic communities, and reduce visibility for aquatic wildlife. Suspended solids may also be a source of heavy metals and nutrients, which may magnify the effect to the aquatic environment. The oxidation of hydrocarbons and chemical reduction of heavy metals found in roadway runoff may facilitate excessive macrophyte/algal growth, with the ultimate effect of depleted dissolved oxygen levels, which could lead to the death of aquatic organisms.

As previously mentioned, the Trinity River Watershed upstream of the project area and along the Dallas Floodway is highly urbanized and storm water runoff carries pollutants from many sources. A search of publicly available records to identify potential hazardous waste/material sites was conducted for the project area. The search focused on hazardous waste/material sites located within 500 feet either side of the proposed alignment. **FEIS Section 3.9** includes a list of the USEPA and TCEQ regulatory databases hazardous waste/material sites considered to have a high probability for contamination located within or nearby the proposed project ROW. Based on the widespread non-point source urban, industrial, and agricultural use of areas contributing drainage to the Dallas Floodway and the identification of hazardous waste/material sites considered to have a high probability for contamination located within or nearby the proposed project ROW, Phase II Environmental Site Investigations were conducted by CH2M Hill and HVJ to develop data required to characterize soils in the vicinity of project elements. The results of the environmental testing are detailed in **Section 3.5** and the attached Technical Memorandum**.** Evaluation of the Dallas Floodway soil data indicated that the identified COCs are widely distributed within the Dallas Floodway and may be considered anthropogenic background for the area. However, isolated areas were identified during the Phase II investigations containing elevated concentrations of COCs. Discharge of contaminants from these localized areas would be controlled during project construction through specialized handling and management procedures. Environmental testing data from the CH2M Hill and HVJ Phase II site investigations indicate that the sources of contamination, physical configuration, and sediment composition in the proposed borrow areas and the final disposal site (i.e., roadway embankment) are substantially similar. Increased suspended particulates and turbidity resulting from re-use of fill material from the proposed borrow sites is not expected to increase contaminants, result in degradation of the disposal site, or result in unacceptable exposure of ecological receptors to contaminants.

3.1.2.2 Water Chemistry

Existing water quality data suggest that surface water quality has already been compromised by wastewater effluent and local urban runoff, including stormwater runoff from existing roadways in the project area and beyond. Concentrations of several pollutants in the water and sediment within the Trinity River, including the segment of the river within the project area, exceed water quality and aquatic wildlife objectives established by the TCEQ and Texas Department of State Health Services (TDSHS). Furthermore, existing concentrations of contaminants (i.e., nitrite plus nitrate, phosphorus, orthophosphorus, fecal coliform bacteria, zinc, chlordane, PCBs) may be adversely affecting the local aquatic environment. The Section 404(b)(1) Guidelines (40 CFR Section 230.11(b)) specify salinity as a component of the determination on water quality. However, given the geographic location of the proposed project and past sampling studies by others, effects on salinity was not included in this analysis.

The proposed project would require fill in various locations, which could include portions of the Dallas Floodway and waters of the U.S., including wetlands. During construction, receiving water quality may be affected as storm water runoff is transported from exposed construction areas to the receiving environment. Increased pavement area and average daily traffic (ADT) over the life of the proposed project have the potential to discharge stormwater pollutants to the Trinity River and wetlands in concentrations that could negatively affect aquatic life. Potential impacts on receiving water quality from both the construction and operation phase may include sedimentation and solids suspension; gross litter accumulation; hydrocarbon and toxicant contamination; and heavy metal accumulation. However, as designed, storm water would not leave the proposed roadway and filter through roadside ditches or vegetation. The floodwall adjacent to the roadway will form a barrier between the roadway and the floodplain floor such that water runoff would enter a storm drain system and then flow into the Trinity River through pipes or channels.

Fill material from the proposed borrow areas will be used for construction of the embankment for the Trinity Parkway. Phase II Environmental Site Investigations were conducted by CH2M Hill and HVJ to develop data required to characterize soils in the vicinity of project elements. The results of the environmental testing are detailed in **Section 3.5** and the attached Technical Memorandum**.** As noted previously, evaluation of the Dallas Floodway soil data indicated that the identified COCs are widely distributed within the Dallas Floodway and may be considered anthropogenic background for the area with the exception of isolated areas. Environmental testing data indicate that the sources of contamination, physical configuration, and sediment composition in the proposed borrow areas and the final disposal site are substantially similar. Discharge of contaminants from the localized areas containing elevated concentrations of COCs would be controlled during project construction through specialized handling and management procedures. Fill material containing elevated concentrations of COCs would be re-used in the core of the roadway embankment and encapsulated with unaffected borrow material. Re-use of fill material from the proposed borrow sites is not expected to adversely effect water quality or result in exposure of contaminants to ecological receptors.

During the short term, the primary impacts to groundwater are associated with erosion during construction. During this time, the exposed earth and stockpiled materials may be eroded and transported into nearby surface water features, which may have the potential to recharge underground water supplies. Over the long term, the main potential impact to groundwater would come from the continuing runoff of debris and pollutants that accumulate on the road surface and along the ROW, or possibly an isolated spill event. An accidental release of hazardous materials could have an adverse impact on the quality of groundwater, especially if such an accident were to occur at a bridge crossing of the Trinity River. The proposed project would involve a crossing of either the Trinity River main stem or one of its associated drainage sumps or tributaries at varying locations. Groundwater is present within alluvial strata primarily associated with the Trinity River terrace deposits throughout the corridor having an average depth to the seasonally high water table varies from 8 to 12 feet below ground (Terra-Mar, 1999). In some cases, groundwater would provide an intermittent open water situation in the deeper borrow pits during wet portions of the year. These shallow groundwater resources exist in sand and gravel soils that are highly permeable, and therefore, would experience some recharge during storm events. As such, shallow groundwater would be susceptible to constituents of concern from storm water runoff associated with the proposed project.

3.1.2.3 Dissolved Gas Levels

The oxidation of hydrocarbons and chemical reduction of heavy metals found in roadway runoff may contribute to the biochemical oxygen demand within a particular water feature. Together with increased nutrient loads, which may facilitate excessive macrophyte/algal growth, the ultimate effect could be the depletion of dissolved oxygen, which could lead to the death of aquatic organisms.

3.1.2.4 Nutrients

Landscaping activities for the proposed project will utilize techniques to minimize the adverse effect that landscaping may have on the local environment. In particular, this means employing landscaping practices and technologies that conserve water and prevent pollution. By using effective landscape management practices, appropriate application of pesticides and fertilizers, and runoff reduction practices, potential impacts to long-term water quality would be minimized. It is not anticipated that the use of landscaping fertilizers during the O&M of the proposed project would result in a substantial contribution to nutrient levels in receiving streams based on current water quality data.

3.1.2.5 Other Water Characteristics

Construction activities would be expected to result in some erosion and sedimentation of local streams despite the deployment of BMPs as part the SWPPP. Given the heavy texture of the dark soils in the floodway, temporary and localized increase in turbidity may occur with rainfall events, and clay particles would likely remain in suspension until the receiving water body reaches a point of near zero velocity. Accordingly, such periodic and temporary increases in clay content would result in minor changes in color, as the typical condition of water bodies in the project area is somewhat turbid. It is not expected that the proposed project would have any effect on the odor of water resources, nor would taste be affected (this is somewhat moot as no surface water in the project area is used for human consumption). The proposed project is not expected to have any effect on water body nutrient loading or eutrophication.

The Trinity River Watershed upstream of the project area and along the Dallas Floodway is highly urbanized and storm water runoff carries pollutants from many sources. Based on the widespread non-point source areas of pollutants along the Dallas Floodway and the identification of hazardous waste/material sites considered to have a high probability for contamination located within or nearby the proposed project ROW, Phase II Environmental Site Investigations were conducted by CH2M Hill and HVJ to develop data required to characterize soils in the vicinity of project elements (see **Section 3.5** and the attached Technical Memorandum**).** Evaluation of the Dallas Floodway soil data indicated that the identified COCs are widely distributed within the Dallas Floodway and may be considered anthropogenic background for the area. Isolated areas were identified during the Phase II investigations containing elevated concentrations of COCS. As noted previously, discharge of contaminants from these localized areas would be controlled during project construction through specialized handling and management procedures. Environmental testing data from the CH2M Hill and HVJ Phase II site investigations indicate that the sources of contamination, physical configuration, and sediment composition in the proposed borrow areas and the final disposal site are substantially similar. Re-use of the dredge and fill material for construction of the roadway is not expected to increase contaminants or adversely affect surface water odor, taste, or nutrient loading in the project area.

3.1.3 Water Circulation and Fluctuations

3.1.3.1 Current Patterns and Water Circulation

Flow patterns associated with the various aquatic habitat types would be altered as a result of the proposed project. Most notably would be during the higher flows of the Trinity River and the linear drainage sumps that drain into the floodway. The borrow areas for the road embankment would excavate portions of the floodway to an elevation above the base flow elevation of the Trinity River and the linear drainage sumps, with the exception of one area that would serve as a secondary channel between the northbound IH-35E bridge and the Corinth Street bridge. **Map 5** inserted at the end of this analysis provides a plan view showing the proposed secondary channel in this area as well as an area where a portion of the existing Trinity River channel would be filled due to encroachment from the proposed roadway. Representative cross section exhibits for this reach of the Dallas Floodway (see **Exhibit 1 to Appendix G-1, Map 5**) were extracted from the hydraulic modeling performed for the project and are also attached along with a table (see **Exhibit 2 to Appendix G-1, Map 5**) showing a comparison of velocities in the area for various flood events ranging from a 1-year event to the 100-year flood. Low flows would continue downstream in a fashion similar to existing conditions, but higher flows would temporarily overflow into the large borrow areas that would be connected to the Trinity River Channel. Low flows within the proposed secondary channel would be comparable to the parallel existing channel and eventually combine with flows within the existing channel downstream. The hydraulic model results demonstrate that, in general, river channel velocities in the area between IH-35E and Corinth Street would decrease slightly if the proposed project is implemented. Because the proposed project would not result in above-normal erosive conditions, it does not appear that the project would pose a threat to channel bank stability. Additional details concerning the hydraulic attributes of Alternative 3C are presented in **FEIS Appendix F**. For portions of the road embankments that cross the linear drainage sumps, bridges and culverts will maintain the existing flow characteristics to avoid interfering with the functioning of the actual sump structure.

Various waters of the U.S., including wetlands, within the floodway may be affected as a result of project construction. Many of the aquatic features within the floodway are large linear complexes that may extend parallel or perpendicular to the Trinity River. Although the excavation would result in the direct loss of the entirety of many of these features, there would be remnant portions of these features that would extend beyond the limits of the excavation. In some areas where shallow excavation would extend only to the edge of these existing features, it would provide an opportunity for the expansion of the footprint of the existing features. However, final grading may also result in some remnant aquatic features that are gradually drained or unable to be hydrologically recharged by local surface runoff.

Several of these linear wetlands convey local surface runoff to the interior linear sumps. Some of these linear drainages would be filled as a result of the roadway embankment. These drainages would need to be reestablished at the toe of the embankment to reestablish existing drainage patterns and prevent excessive ponding within the floodway.

3.1.3.2 Normal Water Fluctuations

Effects to downstream receiving aquatic resources are expected to be limited. There would be no diversion of the actual Trinity River Channel, which would substantially alter downstream flows. Although there may be some minor effect on overbank flooding frequency from the short-term storage effect of the borrow areas, floodplain areas within the project area and downstream of the project area would still be expected to experience overbank flood events consistent with current frequencies.

3.2 Aquatic Ecosystems and Organisms (Subpart D)

3.2.1 Threatened and Endangered Species

Potential effects of the proposed project have been analyzed relative to federally-listed threatened and endangered species with potential for occurrence in the vicinity of the project area. The majority of the species addressed in **FEIS Section 3.4.7** are considered very unlikely to occur in the project area due to lack of preferred habitat or would occur as rare migrants in the vicinity of the project area. As stated in a detailed USFWS study of habitat and species requirements in the Dallas Floodway and nearby areas, "Due to the character of the habitats observed within the study area, it is unlikely that any federally-listed threatened or endangered species would be present" (USFWS, 2010). However, the species discussed below have greater potential for occurring in the project area and, if present or in proximity, would potentially be more likely to be adversely affected. No impacts to any other state or federally-listed, federally-proposed, or federal candidate species would occur as a result of the proposed project.

Coordination with the Texas Parks and Wildlife Department (TPWD) for information from the Texas Natural Diversity Database (NDD) was conducted in April 2013 to obtain a list of known occurrences for any threatened, endangered, or rare species within or near the project area (TPWD, 2013). The NDD includes individual records of occurrences for rare plant and animal resources that are based upon the best available information to TPWD. These records are referenced to geographic points and are provided as GIS shapefiles that facilitate overlaying records of species occurrences with the project area. The NDD data may assist in confirming the likelihood of rare species to occur within a specified area, but the absence of a record in the NDD data is not equated to the absence of a species in the project area.

According to the NDD, there is one Element Occurrence Identification (EOID) record for rare mollusks identified within the project area. EOID 9696 documented the observation on September 22, 2011 of four live Texas pigtoe mussels at four sites located in close proximity to the IH-35E crossing over the Trinity River. Details regarding this observation record are contained in a habitat assessment survey prepared for a proposed TxDOT project (Zara, 2012).

Several other records from the NDD indicate the presence of rare mollusks in the vicinity of the proposed project. EOID 9494 is a recorded observation made in July 2012 of a Louisiana pigtoe mussel approximately 3.6 miles northwest of the proposed project near the California Crossing Bridge over the Elm Fork Trinity River. Also in July 2012, and at the same location, EOID 9695 recorded additional observations of the Texas pigtoe mussel. In this instance, 12 live mussels were collected, ten of which were relocated upstream; EOID 9694 documents the relocation site for the ten mollusk specimens collected under EOID 9695. The remaining two individuals were retained for a genetic and morphological study. This Elm Fork Trinity River site is located northeast of the intersection of W. Northwest Highway and O'Connor Boulevard. Also at this location is EOID 9771, which describes an observation of the sandbank pocketbook (*Lampsilis satura*). Two dead individuals were observed at this location in July 2012. The sandbank pocketbook, a state-listed threatened species, is not listed on TPWD's Annotated County Lists of

Rare Species for Dallas County (TPWD, 2013). This species is typically found in small to large rivers with moderate flows and swift current on gravel, gravel-sand, and sand-bottoms. The listed range is in east Texas, from Sulfur River south through the San Jacinto River basins and the Neches River. EOIDs 9694 and 9771 are located approximately 4 miles northwest of the proposed project. Although located more than 10 miles from the project, it is noteworthy that the state-threatened Texas heelsplitter mussel has been observed upstream of the project area in Grapevine Lake (EOID 9884).

Eight additional EOIDs for non-mollusk species are located within 10 miles of the proposed project. The closest of these is EOID 2952, which is an active rookery located approximately 0.4 mile north of the project area within the Southwestern Medical Center complex. Various egrets and heron species (*Egretta*, *Ardea*, *Bubulcus*, and *Nycticorax* spp.) utilize a 4-acre stand of trees maintained by the medical center. Vegetation features are typical of those found within many urban rookeries, and include hackberry, cedar elm, and bois d'arc species. The rookery is surrounded by urban development, effectively making it an island of habitat within the area. This location is widely known to be utilized each spring by the colonial species noted above.

EOID 1439 lists an egret and heron rookery northwest of Hutchins, approximately 4 miles south of the project area. The rookery, at the intersection of Simpson Stuart Road and Bonnie View Road, was identified in 1988 and last observed in 1990. Since then, residential and commercial development has occurred in the area, and correspondence with local wildlife rehabilitation professionals indicated that no known rookery still exists. In addition, a field visit in July 2008 by the project team resulted in no observation of a rookery in the vicinity. While potential habitat does exist along the Five Mile Creek tributary nearby, it does not appear to be a current nesting site.

The remaining EOIDs report the observation of rare species or egret/heron rookeries or migratory bird colonies found more than 5 miles from the project area. These include the Texas garter snake and nesting areas for the interior least tern. As mentioned in **Section 3.4.7.3**, NDD data is maintained to support determinations of potential species occurrence for geographic areas of interest and to provide specific information where available. However, an absence of NDD data for an area may not be taken as evidence of absence of a species in that area. With the exception of the Texas pigtoe mussel, no recent occurrences of federally- or state-listed threatened or endangered species have been identified in the project study area during field surveys, and no information has been received from past correspondence with the USFWS, TPWD, and other organizations considered to have special expertise related to wildlife and their habitat. Other organizations contacted regarding sensitive species issues included the Dallas Zoo, Audubon Dallas, and Rogers Wildlife Rehabilitation, Inc.

Interior Least Tern

Within the Trinity River basin, the interior least tern (*Sterna antillarum athalassos*) is state and federally-listed as endangered by the TPWD and USFWS. Interior least terns have adapted to using non-traditional nesting habitat, which includes sand and gravel pits, dirt roads, and gravel rooftops instead of expected natural habitat such as sandbars and salt flats (Lott, 2006). In the greater Dallas area, this species has been known to nest on man-made structures, and has been found nesting on top of warehouses along the Elm Fork of the Trinity River in northwestern Dallas County. Nesting terns have also been documented on spoil beds at the Southside Wastewater Treatment Plant, approximately 9 miles southeast of the project area (EOID 2874), which is near a second nesting area at a sand and gravel pit (EOID 7284). The birds spend less than half the year in the Metroplex, arriving in May and nesting until early September, and tend to return to the same sites year after year. Typical nesting sites are usually associated with calm water bodies deep enough to support fish life, which is the primary food source for the tern. However, the species is not generally known to nest in the project area (see **FEIS Appendix A-1**, page 106, Dallas Zoo correspondence).

Another consideration is the possibility of construction activities attracting interior least terns to the area by creating potential nesting habitat in the form of bare open areas near the Trinity River. Monitoring construction sites during late spring would ensure that if terns begin utilizing the area during construction, appropriate measures could be taken to locate and protect nests. Methods to avoid impacts to the interior least tern would be developed as necessary following identification of the preferred alternative and during continued coordination with the USFWS. For these reasons, the proposed project may affect, but is not likely to adversely affect this species.

Field surveys were conducted in July 2008 to determine if the terns were using the project area for nesting or foraging. No evidence of the interior least tern was observed at any potential nesting sites or foraging grounds within the project area (Halff, 2008). The interior least tern survey report was coordinated with the USFWS in February 2009 with a recommended effect determination of “may affect, not likely to adversely affect” for the proposed project. The USFWS concurred with the recommended effect determination on March 2, 2009 (**FEIS Appendix A-1**, page 112).

Mollusk Species

The Trinity River clearly contains potential habitat for all of the mollusk species mentioned in this discussion (see **FEIS Section 3.4.7.3**). Based on NDD records, it may be presumed that the Texas pigtoe mussel may be found in the Trinity River within the project area. There is also a substantial likelihood that Louisiana pigtoe and Texas heelsplitter mussels may occur within the project area, and the Texas heelsplitter and three SOCs may also be present (i.e., fawnsfoot, little spectaclecase, and Wabash pigtoe). In addition, evidence of dead mollusk shells of the sandbank pocketbook mussel from several miles upstream suggest that this state-threatened species could also be found within the Trinity River or major tributaries in the project area. Additionally, mussels may also occur within the open waters within the old meanders of the Trinity River.

As shown in **Table G-1-11**, fill and excavation activities associated with Alternative 3C would affect the Trinity River or other streams, with combined impacts of 7.03 acres. Alternative 3C would affect approximately 0.74 acre of the old meanders of the Trinity River. In addition, indirect impacts resulting from soil erosion and sedimentation from construction sites could prove harmful to mollusks in the Trinity River, despite the implementation of erosion control measures in the SWPPP. Based on these considerations, adverse impacts would be expected to mussel species in the immediate vicinity of any such excavation or fill sites. Potential indirect impacts could include increased sedimentation and decreased water quality due to future development.

In accordance with Chapters 67 and 68 (Sections 68.002, 68.015, and 65.171) of the Texas Wildlife Code (31 TAC Sections 65.175 and 65.176), appropriate survey and/or relocation activities for the proposed project would be completed prior to construction in order to minimize and/or mitigate for potential impacts to state-listed threatened freshwater mussels. As no formal mussel survey and/or relocation protocols for Texas have been issued by the TPWD or USFWS to date, it is expected that mussel survey protocols would be developed in accordance with informal TPWD guidance and with scientific protocols accepted by the TPWD on previous comparable projects. Survey and relocation methodology for the proposed project will be designed and coordinated with the TPWD prior to implementation in the mussel survey area that would be designated for the proposed project. Based on the site-specific mussel survey developed for final design of the proposed project, avoidance measures would be developed that may include relocation of mussels to designated sites upstream or downstream of the project. Accordingly, no substantial adverse impacts are expected to state-listed freshwater mussels that may be in the project area.

Alligator Snapping Turtle

The alligator snapping turtle (*Macrochelys temminckii*) is state-listed as threatened by the TPWD. Alligator snapping turtles require perennial water bodies for habitat. If the species occurs within the project area, the only aquatic features that could provide suitable habitat for the species are the Trinity River and Cedar Creek. Alternative 3C would not impact Cedar Creek, but fill and excavation activities associated with proposed project would affect the Trinity River. The effect these disturbances could have on any alligator snapping turtles inhabiting the river channel is difficult to predict. This excavation and borrow activity would involve benching excavated areas into the overbanks of the Dallas Floodway pilot channel, causing only temporary disturbances to preferred habitat within deeper areas of the river. Fill to the Trinity River between the IH-35E and Corinth Street bridges would occur for the construction of retaining walls. The primary potential adverse impact would be direct contact between construction machinery or fill material with turtles. However, as the alligator snapping turtle is completely aquatic, with females leaving the water only to nest, individual turtles would be expected to move away from excavation activity to undisturbed suitable habitat that is available upstream and downstream of the project. Access and use of such areas by the species would not be restricted by the proposed project. Accordingly, although it is possible that the proposed project could impact this species, substantial adverse impacts are not considered to be likely.

Timber/Canebrake Rattlesnake

The timber/canebrake rattlesnake (*Crotalus horridus*) is state-listed as threatened by the TPWD. The DFW Metroplex, including the project area, represents the far western edge of the range of the timber/canebrake rattlesnake, and is characterized by drier conditions than generally preferred for this snake. Forested areas near the Trinity River in the southern portion of the project area are the most likely to be suitable for this species. Given the limited amount of disturbance relative to the expanse of forested floodplain beyond the scope of the project, it is anticipated that the project would have no effect on the timber/canebrake rattlesnake. The home range of this species is large, at times encompassing in excess of 100 acres. The timber/canebrake rattlesnake is a shy animal that prefers to live in areas with high amounts of cover and available refuge. If a localized population of the rattlesnake occurs within the project area, it would most likely reside deeper within the forested floodplain as this would be preferred for den locations. Also, forested areas near permanent water sources are the most likely to be suitable for this species. Impacts from Alternative 3C to riparian forests and forested wetlands would affect approximately 50 acres of forest habitat. Most of the acreage of possible habitat affected by Alternative 3C occurs between the DART and MLK Boulevard bridges, and consists of isolated areas and fringe areas located at the outer margin of wooded floodplain that extends several miles southeast of the project study area. Although it is unlikely that the rattlesnake would be found within such areas when preferred habitat is available to the south of the project area, proposed construction of Alternative 3C would not likely adversely impact this species. This is because Alternative 3C would not affect more than 10 percent of available habitat within the project area, and it is expected that this species would move deeper into the extensive riparian forests of the Trinity River floodplain to avoid construction activity. Consequently, although it is possible that the project may affect this species, adverse impacts are not likely to occur.

3.2.2 Fish, Crustaceans, Mollusks, and Other Aquatic Biota

As noted in **Section 3.1.2.1**, there exists a potential for an increase in suspended particulates and turbidity for the Trinity River and its network of drainage sumps and tributaries. In many areas, stream banks are denuded containing little or minimal vegetation; sediment composition varies from slippery, clayey mud to fine sand. Aquatic habitat that may provide invertebrate colonization sites or feeding zones for sight feeders is limited to bridge supports, concrete debris, undercut banks or channel snags. However, a USFWS study of fisheries in the Dallas Floodway reach of the Trinity River reported a high level of diversity among fish species, which was in contrast to earlier studies (USFWS, 2004). Moreover, the USFWS study reported an apparent shift from observations in previous studies of low diversity to higher aquatic life use values, as evidenced by an increase in game fish and species considered too intolerant of poor water quality conditions. Although the USFWS study found concerns with water quality in the Trinity River (e.g., detectable amounts of organochlorine contaminants), the study indicates the presence of resilient aquatic biota.

Primary producers in wetlands that are seasonally flooded may include phytoplankton in the ponds, algae, and macrophytes. Suspension feeders or filter-feeding organisms are expected to be limited due to the lack of flows through these systems. Sight feeders include fish species that may occur in the Trinity River; however, emigration would be limited to overbank flood events only. Furthermore, ponding is not year-long and thus insufficient to sustain fish populations. Effects to these wetland biota groups on-site from turbidity are moot for wetland features that will be removed in their entirety. While effects on these biota communities in avoided waters are expected to be minimal, some temporary sedimentation or increased turbidity could be expected to temporarily impact these species communities during project construction.

3.2.3 Other Wildlife

Wildlife diversity and density correlate strongly with vegetation diversity and the type, degree, and frequency of disturbance. Therefore, for the purposes of evaluating the potential impacts to wildlife resources of the proposed project, vegetation impacts serve as a useful indicator of the magnitude of the various wildlife habitats. Urban landscaped areas and floodplain grasslands account for the majority of the areal coverage impacted landscape. However, the greatest impact to wildlife would result from the destruction of forest and wetland habitats. Forested areas require greater regenerative time after clearing as compared to grasslands or emergent wetlands. Furthermore, the vegetation type and associated transition areas to riverine wetlands provide the most valuable habitat for wildlife within the project area. These areas typically contain the greatest diversity of wildlife species. The impacts of forest fragmentation particularly threaten neo-tropical migratory birds and other area-sensitive, interior-woodland avian species. For these reasons, the evaluation of project-related impacts on wildlife is largely focused on the amount of woodlands, especially riparian, as well as the amount of aquatic habitat impacted by the proposed project. Impacts to contiguous stands of mature woodlands would be associated with riparian and bottomland forests in the southern portion of the project area. The proposed project would convert a large amount of emergent wetlands to un-vegetated open water, which would result in additional loss of wildlife habitat.

Varieties of migratory birds utilize the project area. The Migratory Bird Treaty Act (MBTA) states that it is unlawful to kill, capture, collect, possess, buy, sell, trade, or transport any migratory bird, nest, or egg in part or in whole, without a federal permit issued in accordance with MBTA policies and regulations. Migration patterns would not likely be affected; however, a survey of these areas would be conducted prior to construction to verify if any migratory birds are found in the project area. In the event that migratory birds are encountered on-site during construction, every effort will be made to avoid take of protected birds, active nests, eggs, and/or young. Therefore, the requirements for the MBTA appear to be satisfied.

3.3 Special Aquatic Sites (Subpart E)

This subsection examines the potential impacts of the proposed project on a variety of areas that possess special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. Several types of special aquatic sites that are described in the Section 404(b)(1) Guidelines are not discussed herein because they do not occur within the project area (i.e., wildlife sanctuaries and refuges; mudflats, vegetated shallows; coral reefs; and riffle and pool complexes). The project lies in excess of 250 miles from the Gulf of Mexico and thus would not have the potential to affect mudflats, vegetated shallows, or coral reefs. Additionally, there are no wildlife sanctuaries or refuges within 20 miles of the proposed project. Specifically, this subsection addresses the potential impacts to the Trinity River Channel and wetlands within the project area.

The project would involve the removal of approximately 50.25 acres of emergent wetlands that are considered waters of the U.S. As discussed in detail in the FEIS, the majority of these wetlands are emergent wetlands within the Dallas Floodway that are maintained at the emergent stage as part of the regular mowing within the Dallas Floodway. As previously stated, impacts to wetlands are considered "potential" for many of the water features because acreage impacts have been assessed based on the overlap of roadway ROW or excavation areas with water features. However, during final project design the actual fill impacts to a water feature may be substantially reduced, such as in the case of water features located below bridges or ramps that are elevated above ground level. In such cases the impacts to waters of the U.S., including wetlands, would be limited to the relatively small areas required for bridge support columns. All wetlands would be mitigated in accordance with the compensatory mitigation plan, which is provided in **Attachment G-3**.

Riffle and pool complexes are common in the Trinity River; however the reach of the Trinity River within the project area has been channelized in the past and lacks the serpentine meanders which typically allow for the formation of normal stream sequences such as riffle and pool complexes. Due to past channelization, riffle and pool complexes are generally absent in the project area and would not be effected by the proposed project.

3.4 Human Use Characteristics (Subpart F)

This section examines whether the proposed discharges to aquatic resources would contribute to substantial degradation of the human quality of life. Given the setting within a major metropolitan area, elements such as recreation use and aesthetics are of paramount consideration and are discussed, along with other topics, in the following subsections. Given the setting of the proposed project, non-applicable items such as prime and unique farmland and food and fiber production are not discussed further (i.e. no impact).

3.4.1 Municipal and Private Water Supplies

Based on information maintained by the TCEQ, it does not appear that any water utilities draw water directly from the Trinity River in the project area or downstream from the project area in Dallas, Ellis, Kaufman, Henderson, and Navarro counties (TCEQ, 2013b). **Table G-1-14** lists the water utilities in the project area and downstream, as well as their recorded water sources. None of the source reservoirs are on or fed by the Trinity River with the exception of City Lake, or Trinidad Lake. This lake is the City of Trinidad's water source and also provides condensercooling water for a TXU electric generating plant. This lake is an off-channel reservoir, but intakes water from the Trinity River as a recharge source. This lake is located greater than 50 miles downstream from the project area and would not be expected to be adversely impacted by the proposed project.

TABLE G-1-14. MAJOR WATER UTILITIES ALONG THE TRINITY RIVER IN THE PROJECT AREA AND DOWNSTREAM

County	City/Water Utility	Water Provided by	Water Source/Reservoir
Dallas	Dallas	Dallas Water Utilities	Lake Grapevine and Lake Lewisville, via Trinity River north of downtown Dallas
			Lake Ray Hubbard and Lake Tawakoni
	Hutchins	Dallas Water Utilities	See Dallas
	Wilmer	Dallas Water Utilities, via Hutchins (and groundwater)	See Dallas
	Seagoville	Dallas Water Utilities	See Dallas
Dallas, Kaufman	Combine	Dallas Water Utilities, via Seagoville	See Dallas
Ellis	Ferris, and others	Rockett SUD and groundwater	See Rockett SUD
Kaufman	Gastonia Scurry SUD	Purchased from North Texas Municipal Water District	Lake Lavon
			Lake Tawakoni
Ellis	Rockett SUD	Treated raw surface water	Cedar Creek Lake
			Richland Chambers
			Joe Pool Lake
			Lake Waxahachie
Ellis, Navarro	Rice Water Supply	Purchased from Corsicana	Lake Bardwell
			Navarro-Mills Lake
		Purchased from Ennis	Halbert Lake
			Bardwell Lake
Kaufman, Henderson	West Cedar Creek MUD	Treated raw surface water	Cedar Creek Lake
Henderson	City of Trinidad	Treated raw surface water	City Lake (Lake Trinidad)
Navarro	City of Kerens	Purchased from Corsicana	Lake Bardwell
			Navarro-Mills Lake

Source: TCEQ, 2013b.
Abbreviation used in Table: DWU = Dallas Water Utilities; SUD = Special Utility District; MUD = Municipal Utility District
Notes:
There could be water rights holders along the Trinity River that pull water for purposes other than community water supply, such as non-community potable water, agriculture, and industry; however information regarding such uses is not readily available from public data sources.

Discharges of fill material into waters of the U.S., including wetlands, associated with the proposed project would not have any adverse effect on any public water supply, water treatment facilities, or water distribution systems; however, rainfall runoff rates could increase slightly due to the change in vegetation cover. To minimize the possibility of contamination of surface water due to pollutant runoff, proper control measures would be implemented during construction and operation of the proposed project.

3.4.2 Recreational and Commercial Fisheries

Bacteria levels in the Trinity River have exceeded the criterion established to assure the safety of contact recreation. An aquatic life closure was issued by the Texas Department of Health, predecessor to the Texas Department of State Health Services, in 1990 due to the presence of elevated levels of the organochlorine insecticide "chlordane" in fish tissue. This means fishing is allowed, but not the taking of fish for human consumption. Given the existing restrictions on fishing in the Trinity River, together with the fact that most discharges into waters of the U.S., including wetlands, will occur in intermittent wetlands, the proposed project would not have an effect on recreational or commercial fisheries.

3.4.3 Water-Related Recreation

As noted in **Section 2.5.3.2** of this document, bacteria levels have exceeded the criterion established to assure the safety of contact recreation. Therefore, potential water-related recreation impacts would be limited to non-contact recreation activities. One of the goals of the Trinity Parkway Project as a whole is to improve access to existing and future proposed recreational opportunities, including water-related recreation. As such, the proposed project would not have an adverse effect on water-related recreation.

3.4.4 Aesthetics

In the northern and southern segments of the project area, the proposed project is located outside the Dallas Floodway levees, running through the industrial, commercial, and residential districts. The at-grade portions would be visible from businesses and residences in the immediate vicinity. Overpasses, ramps, and other elevated structures of this alternative would be visible to more viewers, including recreational users and residents. Proposed noise barriers adjacent to residences in the southern terminus area would provide visual screening of the roadway. For many of the adjacent residents near the southern terminus, the proposed project and/or noise barriers would serve as a visual and physical barrier.

Within the Dallas Floodway, the proposed project would be visible to recreational users between the levees; in some cases, the roadway itself and access ramps would be visible, while in other cases, the roadway would be hidden from view behind the proposed flood separation wall. From within the forested areas in the southern portion of the project area, aesthetics impacts would occur in terms of visual and noise intrusion. Forest trees will minimize the visual impact from a distance, while noise impacts will extend further into the forest. A more detailed visual impact analysis is provided in **FEIS Section 4.17**.

Waters of the U.S., including wetlands, which would be affected, are interspersed among riparian woodlands and grassland cover types. The majority of these wetlands and drainages have limited visibility from existing roadways and other public access points; hence, they are not commonly or easily viewed by the public. Aesthetic quality of these areas can vary depending on the season and the maintenance schedule (i.e. mowing) within the Dallas Floodway. For example, recently mowed wetland areas during the dry season can be difficult to distinguish from non-wetland grasslands. The aesthetic impact to features within the project footprint would be localized to current viewing opportunities, which are limited. Upon completion, the proposed project will provide a linear element parallel to the Dallas Floodway, providing greater viewing opportunities of the remaining aquatic resources to the public. Litter accumulation is a potential risk during construction and operation of the proposed project; heavy accumulation is typically unsightly and reduces the aesthetic quality of a waterway.

3.4.5 Parks, National and Historical Monuments, and Similar Preserves

The City of Dallas Parks and Recreation Department has indicated that the proposed project would not have a negative impact to any of the existing/planned parks and recreational areas located in the project area. All of the parks in the project vicinity exist in an urban environment where the influences of the local transportation system are part of their operational and functional characteristics. All are located adjacent to or crossed by operating roadways, so the passage of vehicles nearby would not introduce an activity that has not previously existed. As such, the proposed project would not have an adverse effect on parks, national and historical monuments, research sites, and similar preserves.

3.5 Evaluation and Testing (Subpart G)

Studies to date support that borrow or excavation sites generally do not contain elements or substances potentially harmful to fish, wildlife, or other aquatic organisms; additional hazardous material assessments will be conducted during construction to ensure that only suitable material is used as a source of fill.

In October 1999, a geotechnical and environmental investigation was conducted as part of the Trinity River Corridor MIP for the City of Dallas. The purpose of this study was to evaluate soil and sediment quality within the Dallas Floodway. The project limits extended from the

Hampton/Inwood Bridge to just southeast of the Corinth Street Viaduct. The investigation included the collection of 26 soil samples from 13 soil borings completed within the project limits. The soil samples were submitted for laboratory analysis of pesticides, herbicides, SVOCs, VOCs, and total RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). The study also included a review of previous environmental investigations conducted by others within the Dallas Floodway. A total of three sediment samples and 47 soil samples collected from 41 different locations within the Dallas Floodway over a 16-year period between 1984 and 1999 were evaluated as part of this study. No herbicides, PCBs, VOCs, or semi-volatile organic compounds (SVOCs) were identified at concentrations above laboratory detection limits. The study identified detectable concentrations of the pesticides aldrin, dieldrin, dichloro-diphenyl-trichloroethane (DDT), dichloro-diphenyl-dichloroethane (DDD), and dichloro-diphenyl-dichloroethylene (DDE) in soils. In addition, detectable concentrations of total RCRA metals and the metals copper, manganese, nickel, and zinc were identified. However, the study concluded that soils within the Dallas Floodway did not appear to contain hazardous levels of contaminants (Terra-Mar, Inc., 1999). A fisheries survey of the Trinity River in the Dallas Floodway was produced in 2004 that focused on chemicals found in common fish species, and found myriad pesticides in detectible amounts in most fishes including chlordane, DDT, DDE, and PCBs (USFWS, 2004).

More recent environmental investigations were conducted within the Dallas Floodway from October 2007 to February 2008 as part of the USACE Upper Trinity River Interim Feasibility Study. The investigation activities included the collection of 192 soil samples from 96 boring locations for analysis of VOCs, SVOCs, pesticides, PCBs, RCRA metals, and herbicides. The investigation identified detectable concentrations of constituents of concern at various locations throughout the floodway (CH2M Hill, 2008). An additional environmental investigation was conducted in October 2008 within the Dallas Floodway as part of the City of Dallas' Trinity Bridges and Utilities Project. This investigation included the collection of 58 soil samples from 29 soil borings within the proposed borrow areas for analysis of VOCs, PAHs, RCRA metals, and pesticides. The investigation identified detectable concentrations of constituents of concern within the borrow areas (HVJ, 2008).

The City of Dallas is pursuing a MSD for the Dallas Floodway. The MSD boundary has been defined and surveyed and includes the borrow sites proposed for fill material required for implementation of Alternative 3C. The MSD will restrict the use of shallow groundwater beneath the Dallas Floodway and eliminate ingestion of groundwater as a potential exposure pathway. Analytical data developed during the completion of the CH2M Hill and HVJ Phase II Environmental Site Assessments have been evaluated in accordance with applicable TCEQ

TRRP PCLs based upon anticipation of certification of the Dallas Floodway as a MSD. In addition, the environmental testing data has been evaluated in order to establish site specific background concentrations for metals within the Dallas Floodway. Soil analytical data from the floodway corridor were reviewed and the concentrations of COCs were compared to TRRP PCLs with a MSD (TRRP Non-ingestion PCLs) and Soil Ecological Benchmarks. None of the soil samples collected from the proposed borrow areas contained concentrations of potential COCs exceeding the TRRP Non-ingestion PCLs. Only four soil samples, two soil samples collected from the eastern portion of Borrow Site A at a depth of 4-8 feet below ground surface (bgs), one soil sample from the southern portion of Borrow Site E collected from a depth of 0-2 feet bgs, and one sample from the central portion of Borrow Site J collected from a depth of 4-8 feet bgs contained concentrations of potential COCs exceeding the TRRP Soil Ecological Benchmarks (see **Appendix G-1, Map 3**). These four soil samples contained the following elevated COCs: concentrations of barium and chromium exceeding the Soil Ecological Benchmarks were identified in Borrow Site A, concentrations of arsenic, barium, and chromium exceeding the Soil Ecological Benchmarks were identified in Borrow Site E, and concentrations of selenium exceeding the Soil Ecological Benchmarks were identified in Borrow Site J. None of the samples collected from the borrow areas contained concentrations of VOCs, SVOCs/PAHs, herbicides, pesticides, and/or PCBs exceeding Soil Ecological Benchmarks. Potential human health and ecological exposure has been considered and mitigative measures that may be implemented during the design and construction of Alternative 3C have been identified to eliminate unacceptable exposure. The details of the evaluation of the environmental testing data and mitigative measures are presented in the attached Technical Memorandum.

3.6 Minimizing Impacts and Compensatory Mitigation (Subparts H and J)

The discussion of additional requirements of the Section 404(b)(1) Guidelines relating to minimizing impacts (Subpart H) and compensatory mitigation (Subpart J) is addressed in the Draft Mitigation Plan for the Trinity Parkway, which is **FEIS Appendix G-3**.

4.0 SUMMARY

The discharge of dredged or fill material has the potential to cause substantial degradation of waters of the U.S., including wetlands. This report (which includes **FEIS Appendix G-3**) details all appropriate steps that have been or would be taken to avoid and minimize impacts to waters of the U.S., including wetlands, and to compensate for all unavoidable impacts to waters of the U.S., including wetlands, that would result from the proposed project (also see **FEIS Section 4.8**). The proposed disposal sites for the direct discharge of dredged or fill material are specified as complying with the requirements of the Section 404(b)(1) Guidelines, with the implementation of appropriate and practicable measures to minimize pollution or adverse effects on the aquatic system.

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NOTE:

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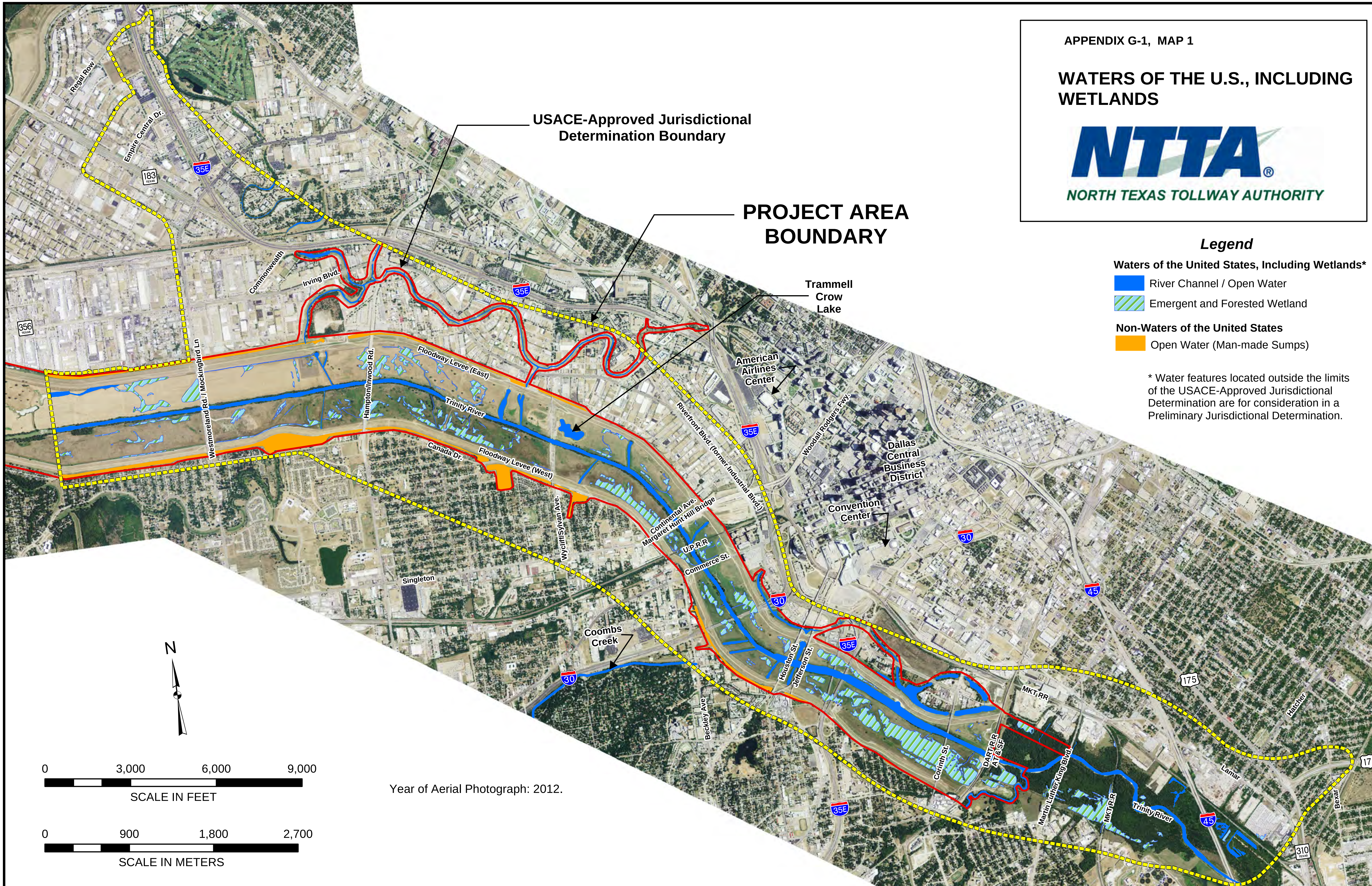
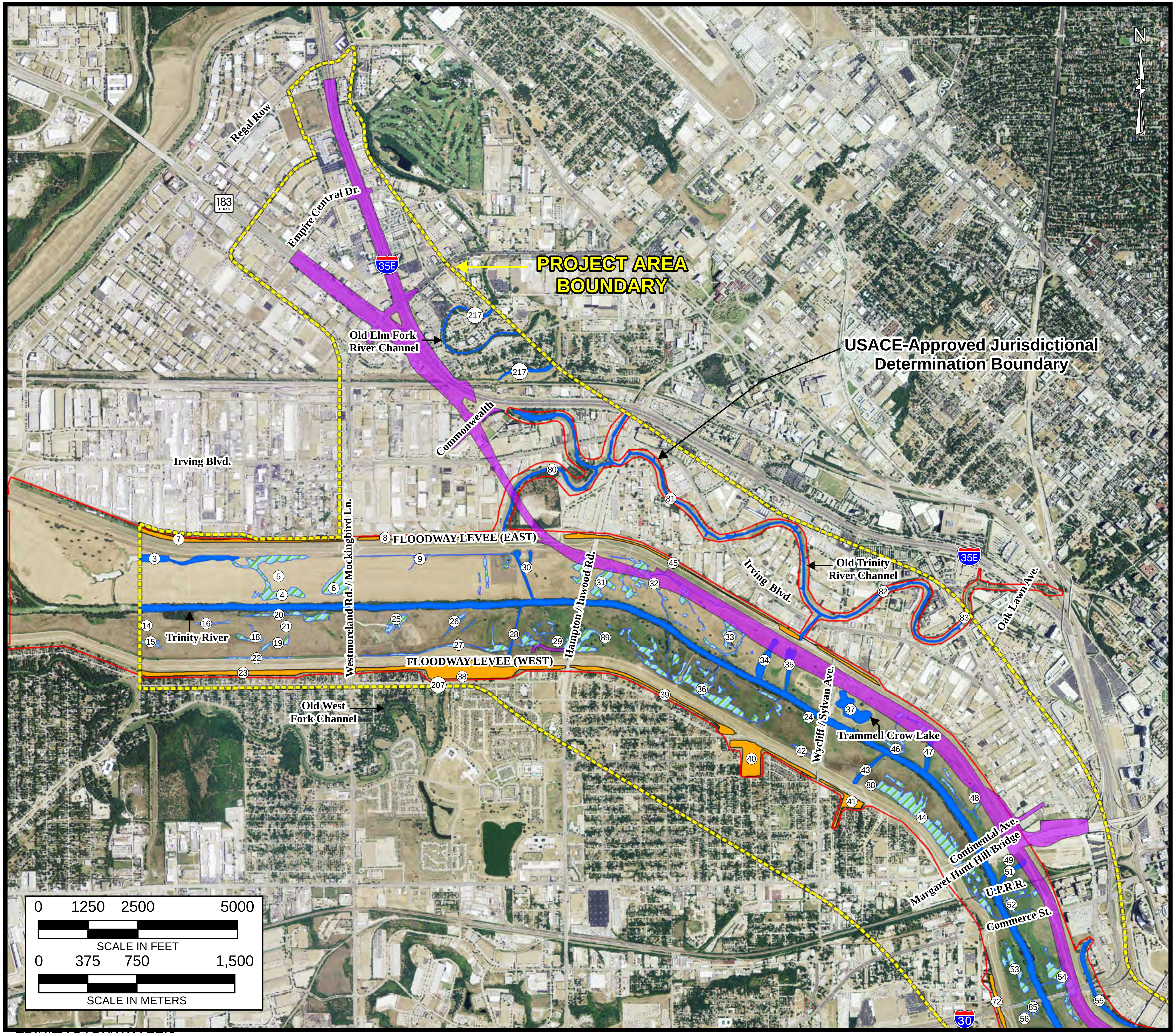


APPENDIX G-1, MAP 1
WATERS OF THE U.S., INCLUDING WETLANDS
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
Legend
Waters of the United States, Including Wetlands*
River Channel / Open Water
Emergent and Forested Wetland
Non-Waters of the United States
Open Water (Man-made Sumps)
* Water features located outside the limits of the USACE-Approved Jurisdictional Determination are for consideration in a Preliminary Jurisdictional Determination.
USACE-Approved Jurisdictional Determination Boundary
PROJECT AREA BOUNDARY
Trammell Crow Lake
American Airlines Center
Dallas Central Business District
Convention Center
Coombs Creek
Regal Row
Empire Central Dr.
Commonwealth
Irving Blvd.
Westmoreland Rd. / Mockingbird Ln
Hampton/Inwood Rd.
Floodway Levee (East)
Floodway Levee (West)
Trinity River
Canada Dr.
Wycliff/Sylvan Ave.
Continental Ave. Margaret Hunt Hill Bridge
U.P.R.R
Commerce St.
Riverfront Blvd. (former Industrial Blvd.)
Woodall Rodgers Fwy.
Singleton
Houston St.
Jefferson St.
Beckley Ave.
Corinth St.
DART R.R AT&SF
Martin Luther King Blvd.
MKT R.R
MKT RR
Lamar
Hatcher
Bexar
35E
183
356
30
45
175
310
N
0 3,000 6,000 9,000
SCALE IN FEET
0 900 1,800 2,700
SCALE IN METERS
Year of Aerial Photograph: 2012.

APPENDIX G-1, MAP 2 (SHEET 1 OF 2)

PROJECT ROW AND WATERS OF THE U.S., INCLUDING WETLANDS

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



MATCH LINE

PROPOSED ROW AREA

ALTERNATIVE 3C COMBINED PARKWAY - RIVERSIDE (FURTHER MODIFIED)

WATERS OF THE UNITED STATES, INCLUDING WETLANDS*

OPEN WATER / RIVER CHANNEL

EMERGENT WETLAND

FORESTED WETLAND

10 WETLAND & WATERWAY FEATURE IDENTIFIER

NON-WATERS OF THE UNITED STATES

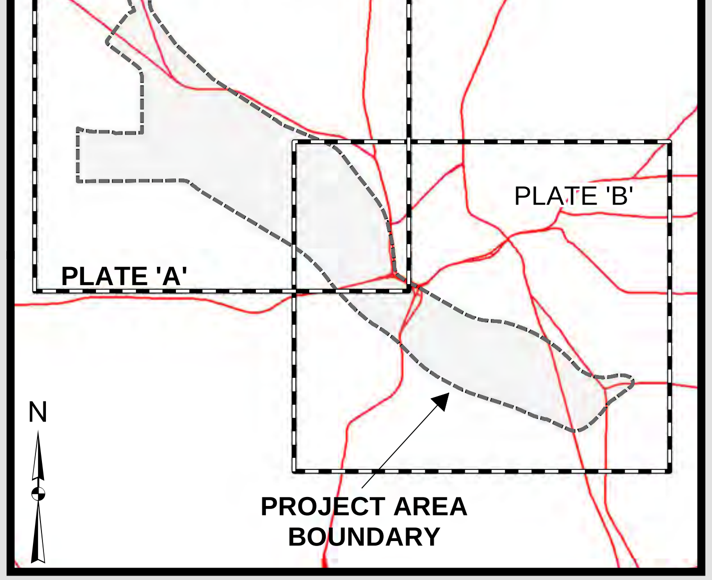
OPEN WATER (MAN-MADE SUMPS)

NOTES:

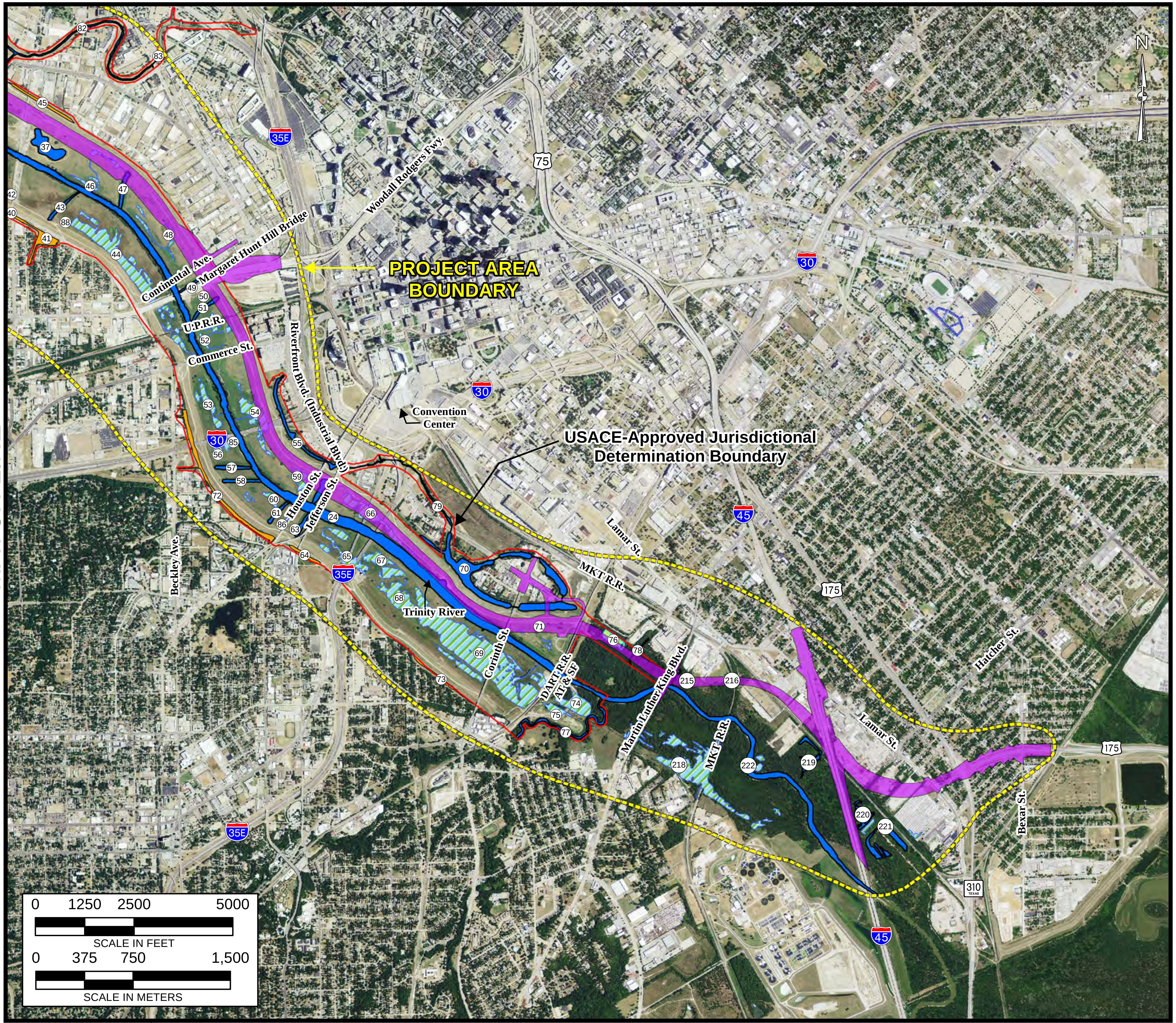
* WATER FEATURES LOCATED OUTSIDE THE LIMITS OF THE USACE-APPROVED JURISDICTIONAL DETERMINATION ARE FOR CONSIDERATION IN A PRELIMINARY JURISDICTIONAL DETERMINATION.

LOCATIONS ARE APPROXIMATE.

KEY MAP



MATCH LINE



APPENDIX G-1, MAP 2 (SHEET 2 OF 2)

PROJECT ROW AND WATERS OF THE U.S., INCLUDING WETLANDS

NTTA
NORTH TEXAS TOLLWAY AUTHORITY

PROPOSED ROW AREA

ALTERNATIVE 3C COMBINED PARKWAY - RIVERSIDE (FURTHER MODIFIED)

WATERS OF THE UNITED STATES, INCLUDING WETLANDS*

- OPEN WATER / RIVER CHANNEL
- EMERGENT WETLAND
- FORESTED WETLAND
- 10 WETLAND & WATERWAY FEATURE IDENTIFIER

NON-WATERS OF THE UNITED STATES

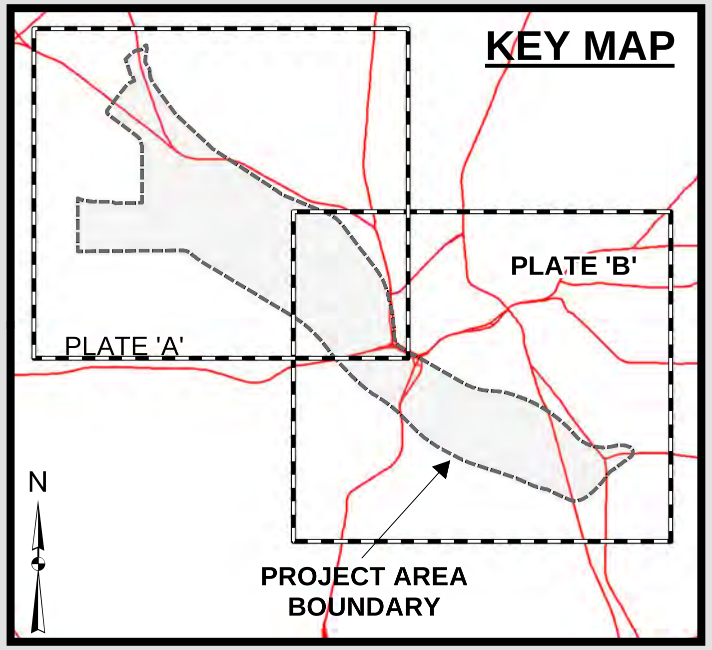
- OPEN WATER (MAN-MADE SUMPS)

NOTES:

* WATER FEATURES LOCATED OUTSIDE THE LIMITS OF THE USACE-APPROVED JURISDICTIONAL DETERMINATION ARE FOR CONSIDERATION IN A PRELIMINARY JURISDICTIONAL DETERMINATION.

LOCATIONS ARE APPROXIMATE.

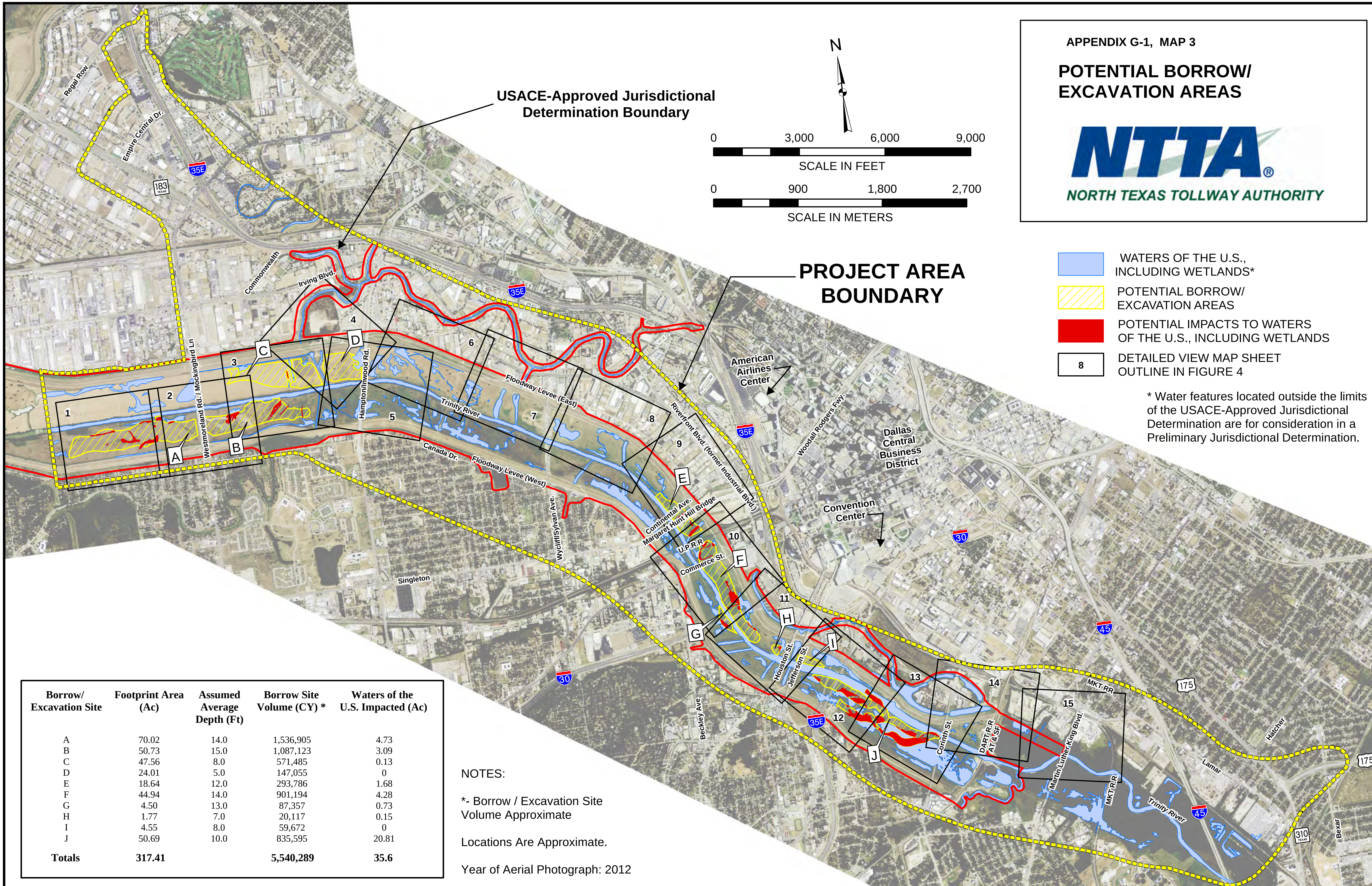
KEY MAP



APPENDIX G-1, MAP 3

POTENTIAL BORROW/ EXCAVATION AREAS

NORTH TEXAS TOLLWAY AUTHORITY



WATERS OF THE U.S., INCLUDING WETLANDS*

POTENTIAL BORROW/ EXCAVATION AREAS

POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

8 DETAILED VIEW MAP SHEET OUTLINE IN FIGURE 4

* Water features located outside the limits of the USACE-Approved Jurisdictional Determination are for consideration in a Preliminary Jurisdictional Determination.

Borrow/ Excavation Site	Footprint Area (Ac)	Assumed Average Depth (Ft)	Borrow Site Volume (CY) *	Waters of the U.S. Impacted (Ac)
A	70.02	14.0	1,536,905	4.73
B	50.73	15.0	1,087,123	3.09
C	47.56	8.0	571,485	0.13
D	24.01	5.0	147,055	0
E	18.64	12.0	293,786	1.68
F	44.94	14.0	901,194	4.28
G	4.50	13.0	87,357	0.73
H	1.77	7.0	20,117	0.15
I	4.55	8.0	59,672	0
J	50.69	10.0	835,595	20.81
Totals	**317.41**		**5,540,289**	**35.6**

NOTES:

*- Borrow / Excavation Site Volume Approximate

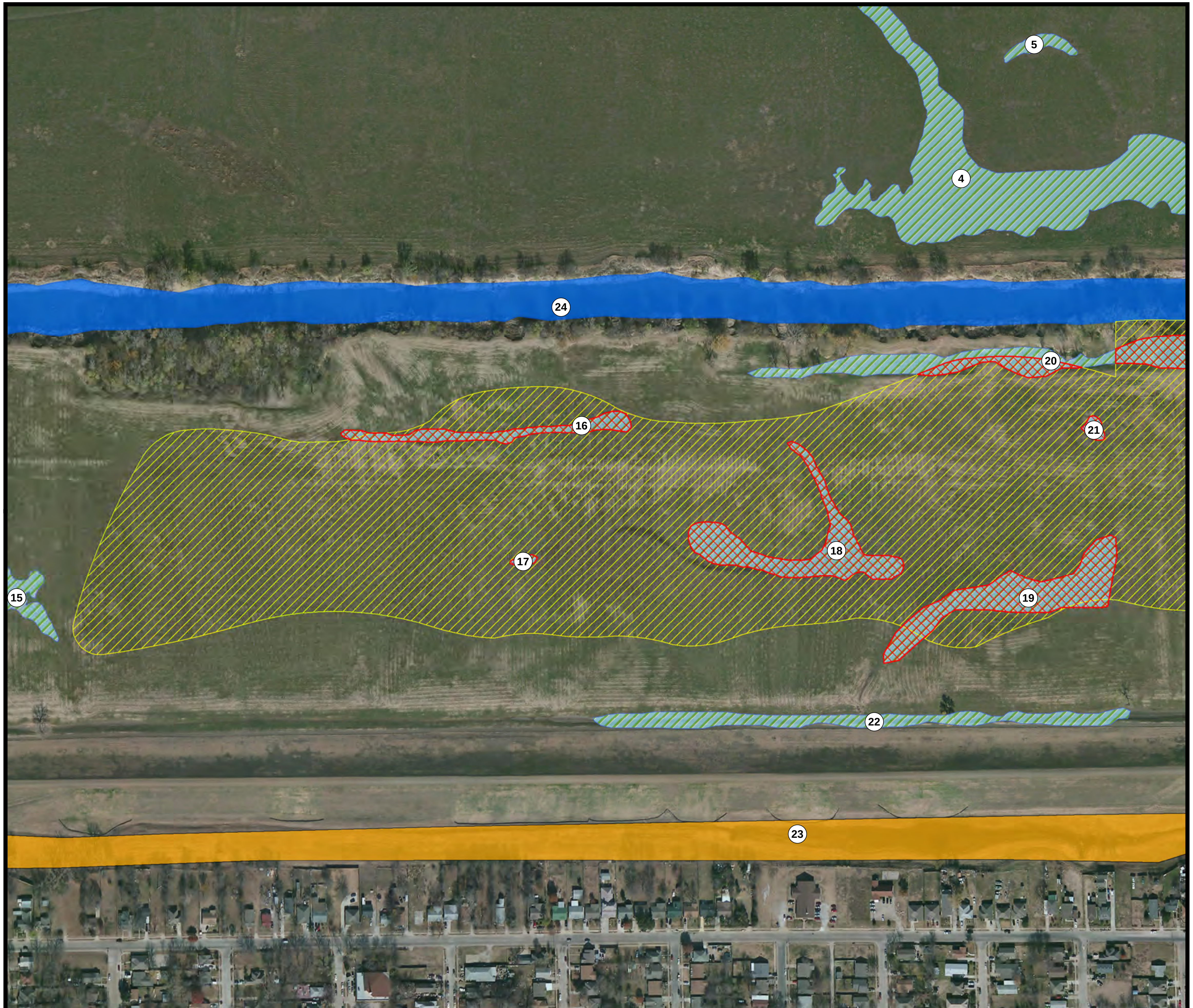
Locations Are Approximate.

Year of Aerial Photograph: 2012

APPENDIX G-1, MAP 4 (SHEET 1 OF 15)

POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



Legend

Design Aspects Features

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Diaphragm Wall
- Proposed Flood, Retaining or Security Wall
- Proposed Culvert
- Proposed Edge of Concrete Pavement
- Proposed Excavation Area
- Proposed Road/ Ramp at Grade
- Proposed Bridge
- Proposed Bridge/ Pavement Removal
- Proposed Park Access
- Proposed ROW
- Existing ROW

Waters of U.S. and Impacts

- Emergent Wetland
- Forested Wetland
- Open Water/River Channel
- Outline of Potential Impacts*

Non-Waters of U.S.

- Open Water (Man-made Sumps)

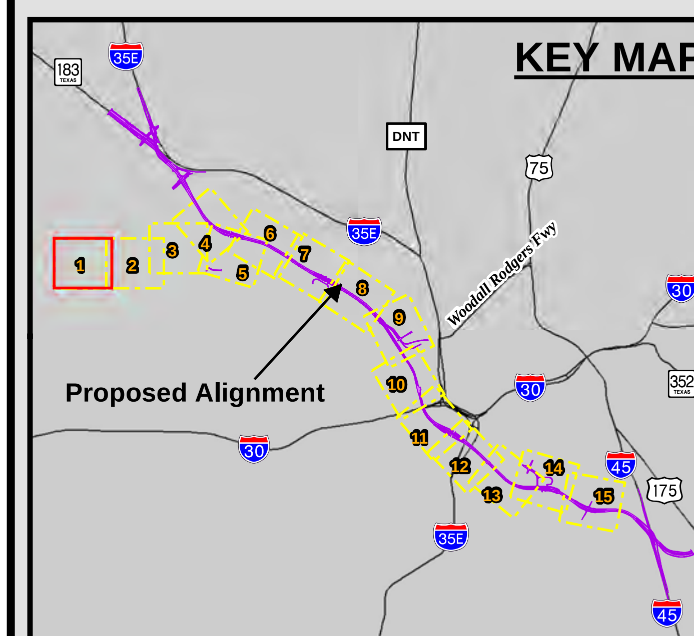
* In some instances, emergent wetland impacts extend beyond excavation areas where loss of wetland function is likely.

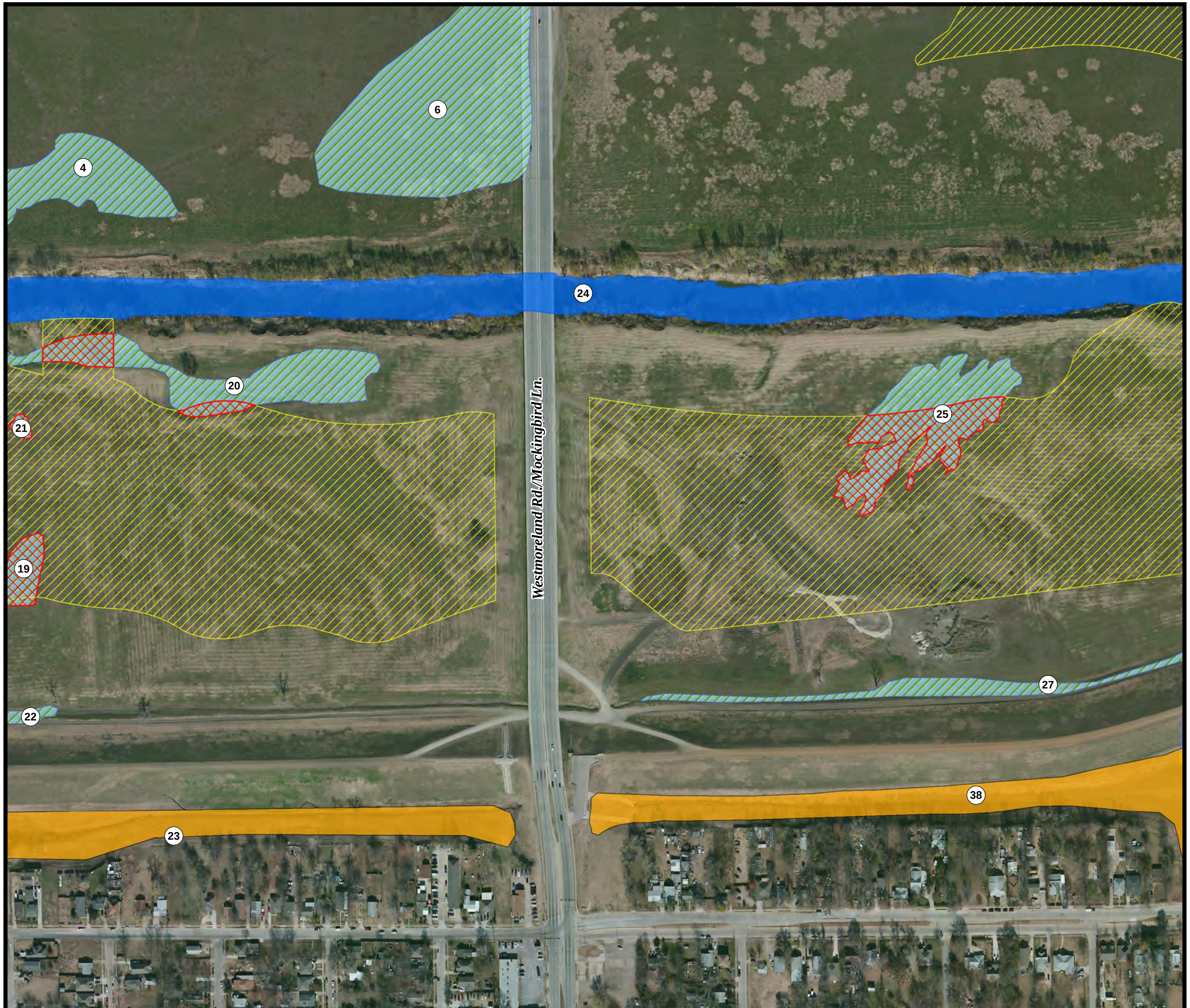
N

0 300 600 900
SCALE IN FEET

0 90 180 270
SCALE IN METERS

Note: Year of Aerial Photograph: 2011.





APPENDIX G-1, MAP 4 (SHEET 2 OF 15)

POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

NTTA

NORTH TEXAS TOLLWAY AUTHORITY

Legend

Design Aspects Features

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Diaphragm Wall
- Proposed Flood, Retaining or Security Wall
- Proposed Culvert
- Proposed Edge of Concrete Pavement
- Proposed Excavation Area
- Proposed Road/ Ramp at Grade
- Proposed Bridge
- Proposed Bridge/ Pavement Removal
- Proposed Park Access
- Proposed ROW
- Existing ROW

Waters of U.S. and Impacts

- Emergent Wetland
- Forested Wetland
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- Outline of Potential Impacts*

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N

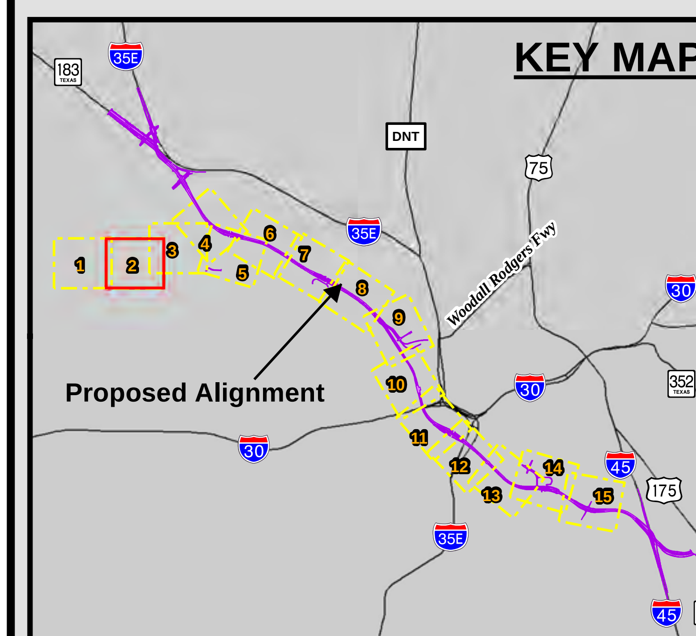
0 300 600 900

SCALE IN FEET

0 90 180 270

SCALE IN METERS

Note: Year of Aerial Photograph: 2011.



APPENDIX G-1, MAP 4 (SHEET 3 OF 15)

POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

NTTA®

NORTH TEXAS TOLLWAY AUTHORITY

Legend

Design Aspects Features

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Diaphragm Wall
- Proposed Flood, Retaining or Security Wall
- Proposed Culvert
- Proposed Edge of Concrete Pavement
- Proposed Excavation Area
- Proposed Road/ Ramp at Grade
- Proposed Bridge
- Proposed Bridge/ Pavement Removal
- Proposed Park Access
- Proposed ROW
- Existing ROW

Waters of U.S. and Impacts

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- Forested Wetland
- Open Water/River Channel
- Outline of Potential Impacts*

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N

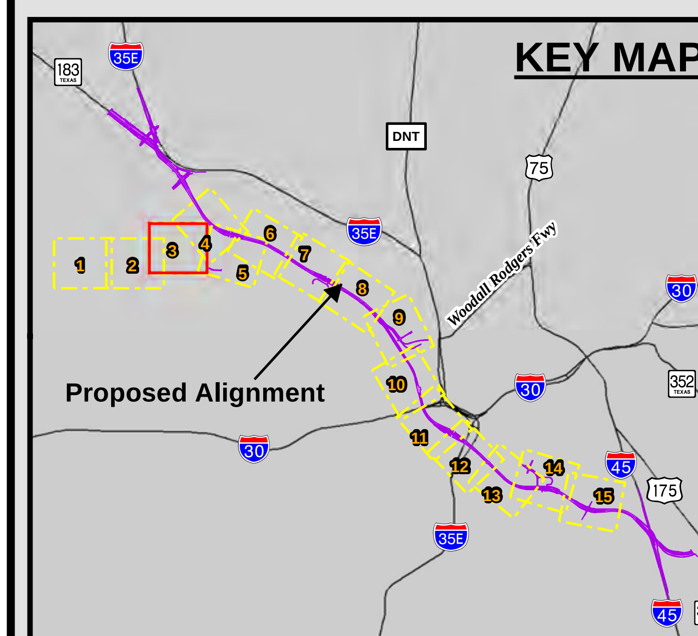
0 300 600 900

SCALE IN FEET

0 90 180 270

SCALE IN METERS

Note: Year of Aerial Photograph: 2011.



APPENDIX G-1, MAP 4 (SHEET 4 OF 15)

POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

Legend

Design Aspects Features

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Diaphragm Wall
- Proposed Flood, Retaining or Security Wall
- Proposed Culvert
- Proposed Edge of Concrete Pavement
- Proposed Excavation Area
- Proposed Road/ Ramp at Grade
- Proposed Bridge
- Proposed Bridge/ Pavement Removal
- Proposed Park Access
- Proposed ROW
- Existing ROW

Waters of U.S. and Impacts

- Emergent Wetland
- Forested Wetland
- Open Water/River Channel
- Outline of Potential Impacts*

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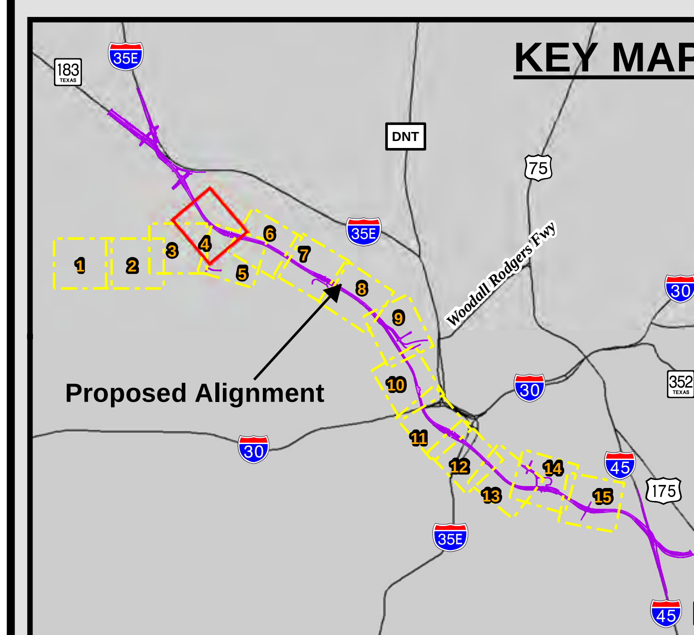
N

0 300 600 900
SCALE IN FEET

0 90 180 270
SCALE IN METERS

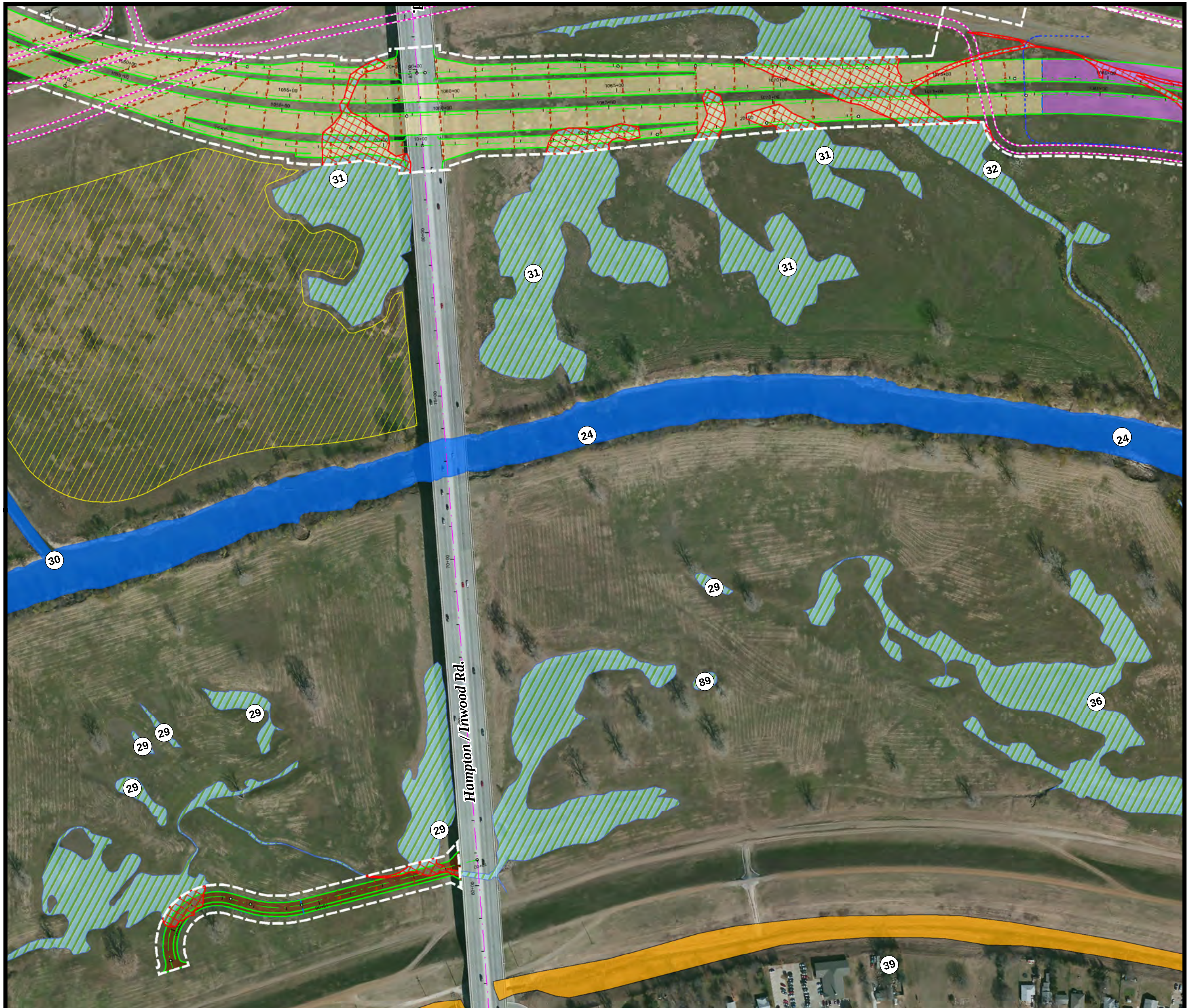
Note: Year of Aerial Photograph: 2011.



APPENDIX G-1, MAP 4 (SHEET 5 OF 15)

POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

NTTA® NORTH TEXAS TOLLWAY AUTHORITY



Legend

Design Aspects Features

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Diaphragm Wall
- Proposed Flood, Retaining or Security Wall
- Proposed Culvert
- Proposed Edge of Concrete Pavement
- Proposed Excavation Area
- Proposed Road/ Ramp at Grade
- Proposed Bridge
- Proposed Bridge/ Pavement Removal
- Proposed Park Access
- Proposed ROW
- Existing ROW

Waters of U.S. and Impacts

- Emergent Wetland
- Forested Wetland
- Open Water/River Channel
- Outline of Potential Impacts*

Non-Waters of U.S.

- Open Water (Man-made Sumps)

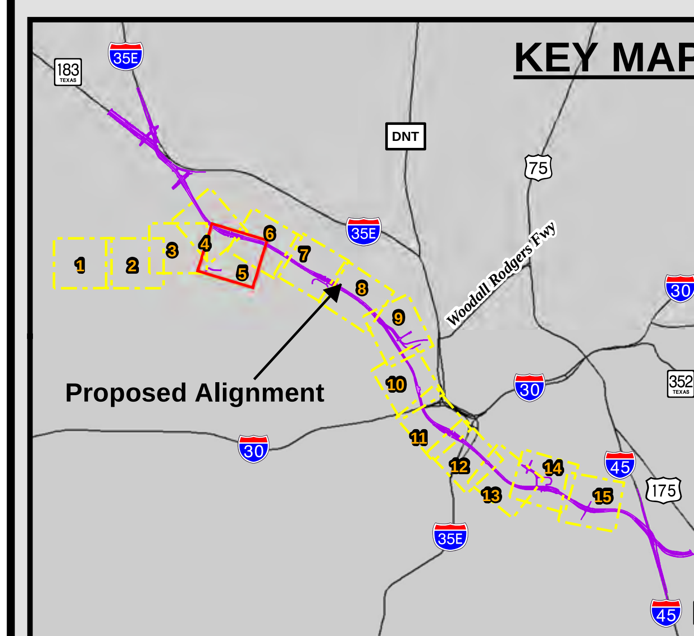
* In some instances, emergent wetland impacts extend beyond excavation areas where loss of wetland function is likely.

N

0 300 600 900
SCALE IN FEET

0 90 180 270
SCALE IN METERS

Note: Year of Aerial Photograph: 2011.



APPENDIX G-1, MAP 4 (SHEET 6 OF 15)

POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

Legend

Design Aspects Features

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Diaphragm Wall
- Proposed Flood, Retaining or Security Wall
- Proposed Culvert
- Proposed Edge of Concrete Pavement
- Proposed Excavation Area
- Proposed Road/ Ramp at Grade
- Proposed Bridge
- Proposed Bridge/ Pavement Removal
- Proposed Park Access
- Proposed ROW
- Existing ROW

Waters of U.S. and Impacts

- Emergent Wetland
- Forested Wetland
- Open Water/River Channel
- Outline of Potential Impacts*

Non-Waters of U.S.

- Open Water (Man-made Sumps)

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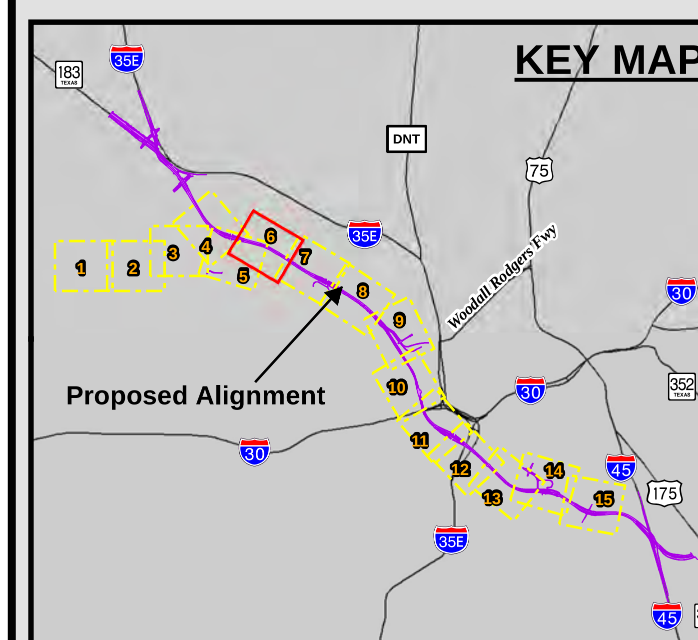
N

0 300 600 900
SCALE IN FEET

0 90 180 270
SCALE IN METERS

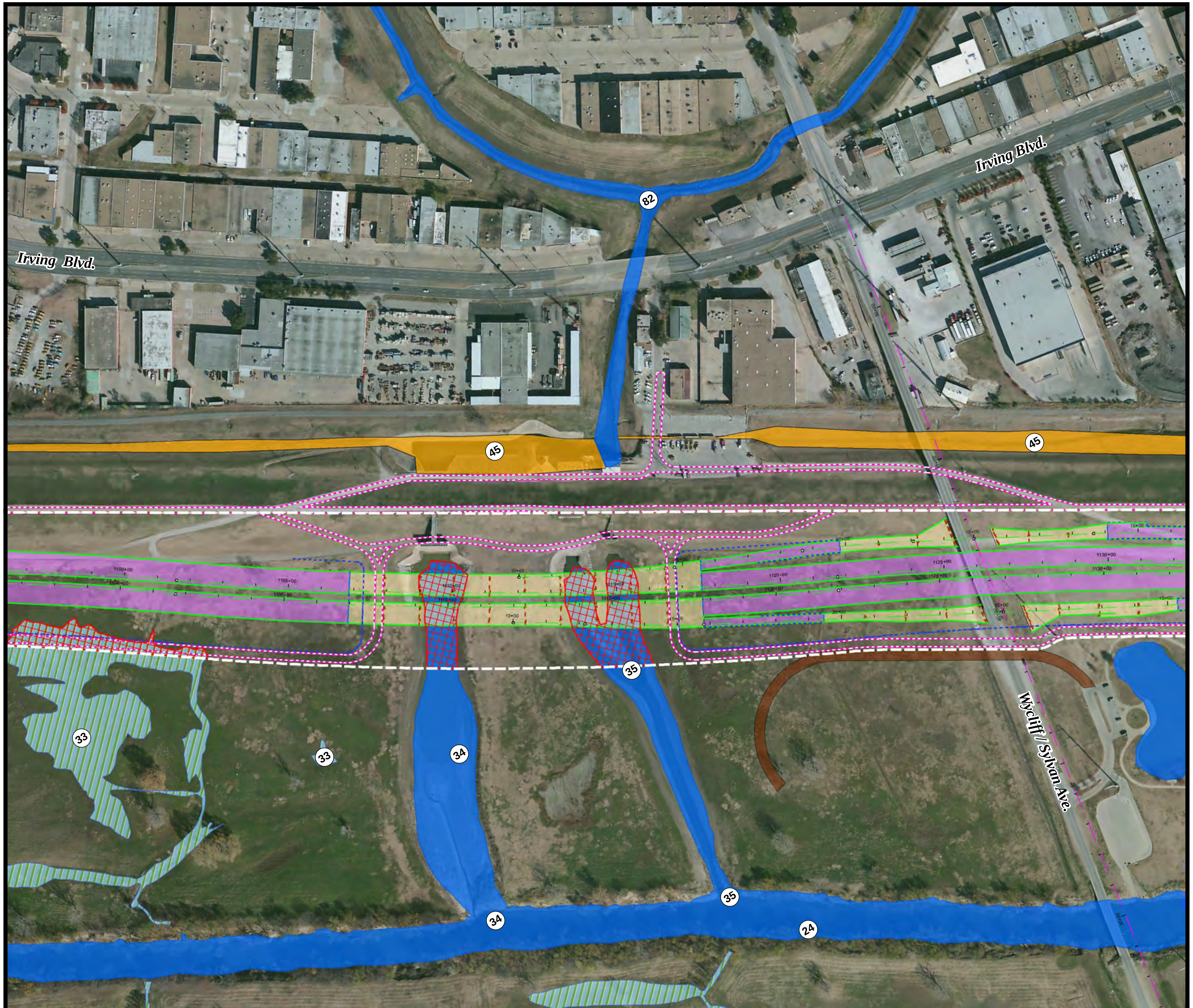
Note: Year of Aerial Photograph: 2011.



APPENDIX G-1, MAP 4 (SHEET 7 OF 15)

POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

NTTA® NORTH TEXAS TOLLWAY AUTHORITY



Legend

Design Aspects Features

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Diaphragm Wall
- Proposed Flood, Retaining or Security Wall
- Proposed Culvert
- Proposed Edge of Concrete Pavement
- Proposed Excavation Area
- Proposed Road/ Ramp at Grade
- Proposed Bridge
- Proposed Bridge/ Pavement Removal
- Proposed Park Access
- Proposed ROW
- Existing ROW

Waters of U.S. and Impacts

- Emergent Wetland
- Forested Wetland
- Open Water/River Channel
- Outline of Potential Impacts*

Non-Waters of U.S.

- Open Water (Man-made Sumps)

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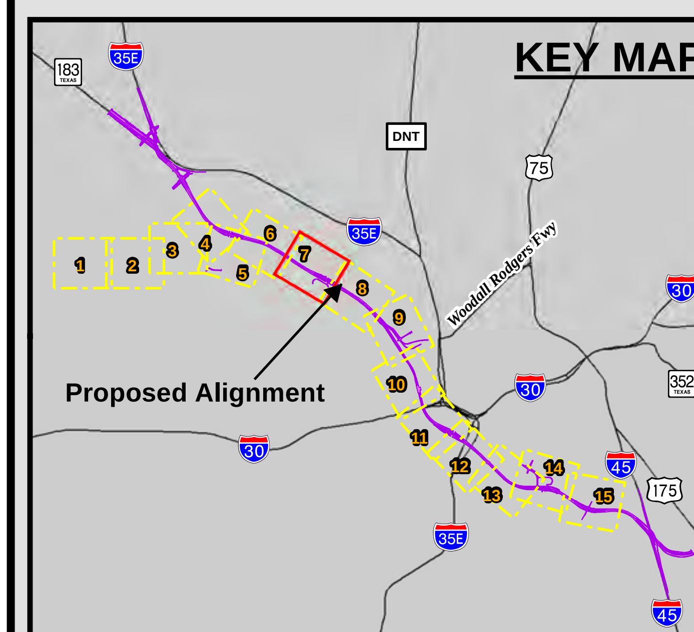
N

0 300 600 900
SCALE IN FEET

0 90 180 270
SCALE IN METERS

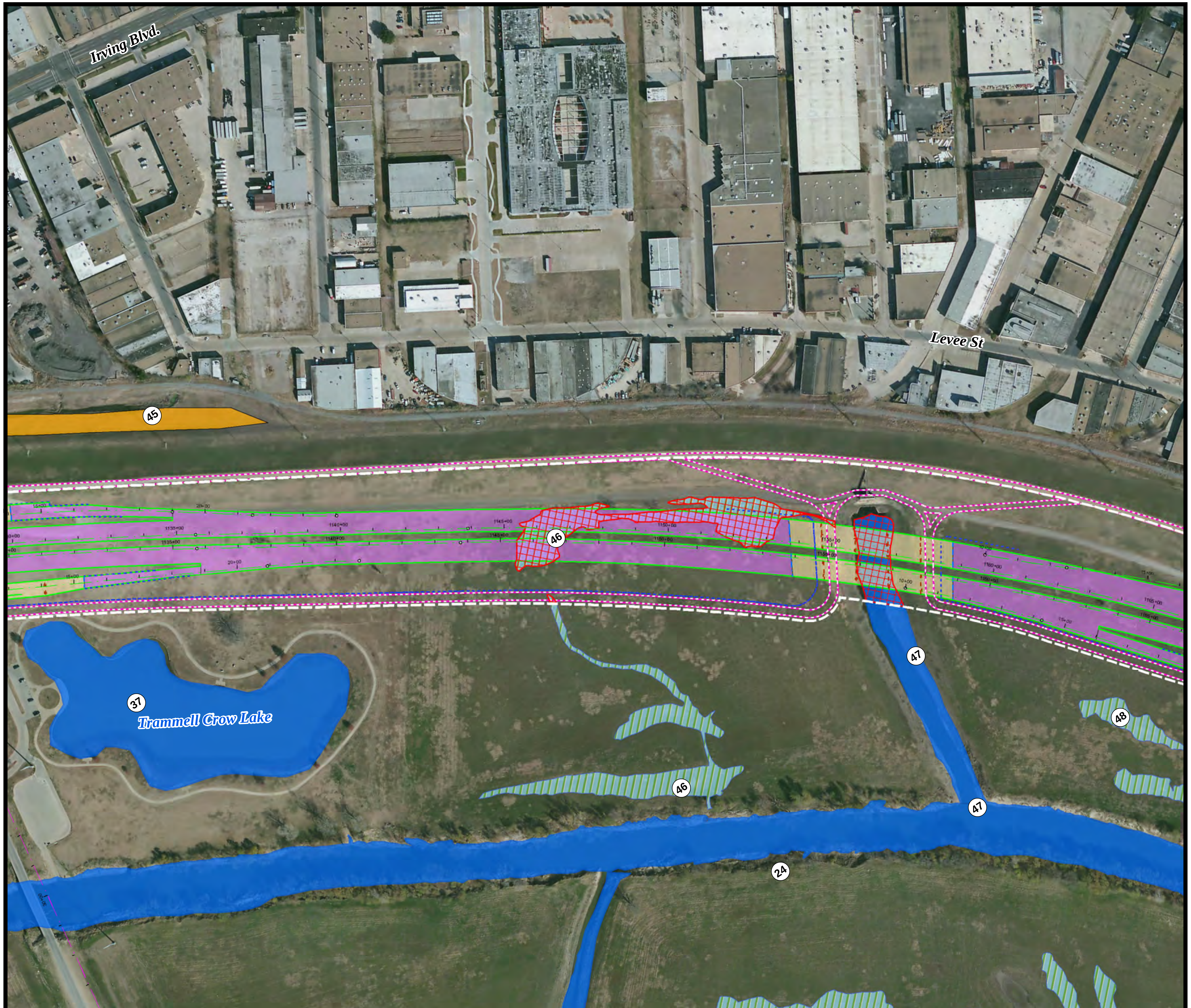
Note: Year of Aerial Photograph: 2011.



APPENDIX G-1, MAP 4 (SHEET 8 OF 15)

POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



Legend

Design Aspects Features

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Diaphragm Wall
- Proposed Flood, Retaining or Security Wall
- Proposed Culvert
- Proposed Edge of Concrete Pavement
- Proposed Excavation Area
- Proposed Road/ Ramp at Grade
- Proposed Bridge
- Proposed Bridge/ Pavement Removal
- Proposed Park Access
- Proposed ROW
- Existing ROW

Waters of U.S. and Impacts

- Emergent Wetland
- Forested Wetland
- Open Water/River Channel
- Outline of Potential Impacts*

Non-Waters of U.S.

- Open Water (Man-made Sumps)

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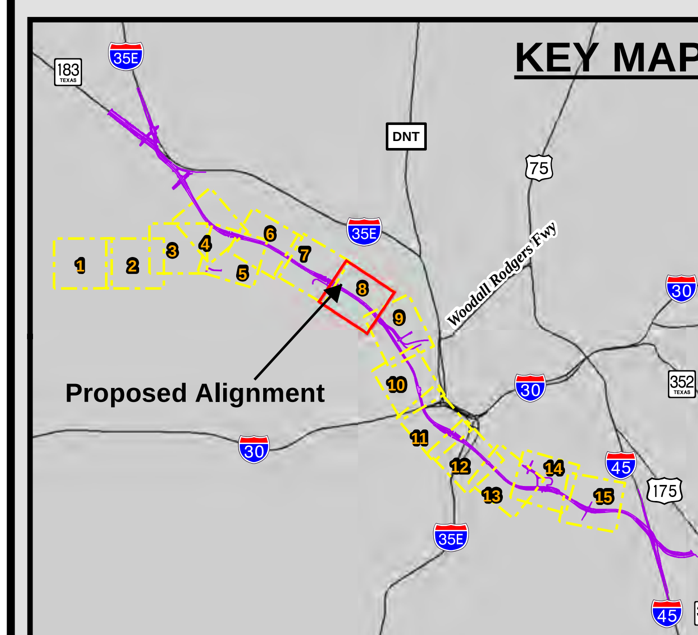
N

0 300 600 900
SCALE IN FEET

0 90 180 270
SCALE IN METERS

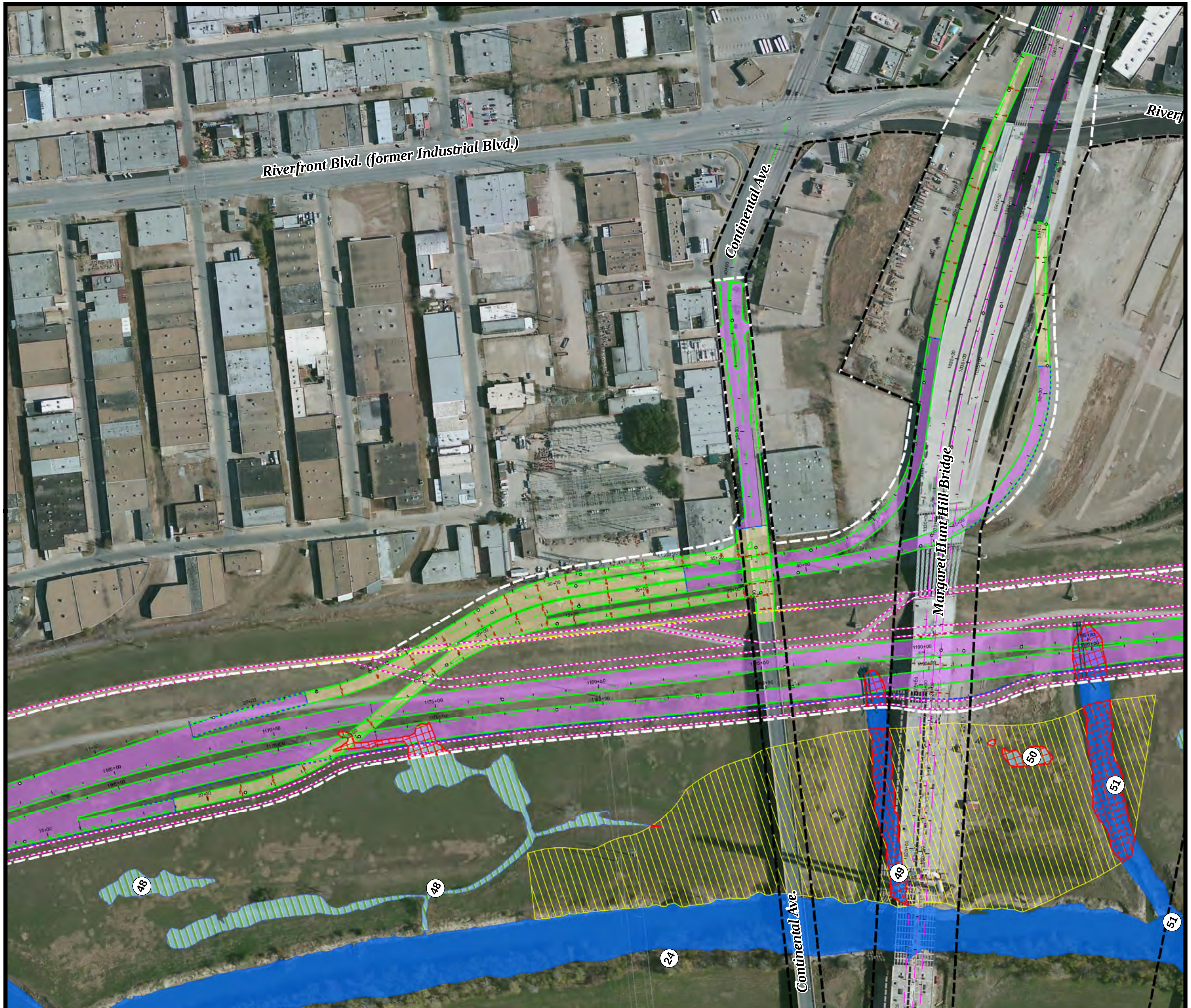
Note: Year of Aerial Photograph: 2011.



APPENDIX G-1, MAP 4 (SHEET 9 OF 15)

POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



Legend

Design Aspects Features

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Diaphragm Wall
- Proposed Flood, Retaining or Security Wall
- Proposed Culvert
- Proposed Edge of Concrete Pavement
- Proposed Excavation Area
- Proposed Road/ Ramp at Grade
- Proposed Bridge
- Proposed Bridge/ Pavement Removal
- Proposed Park Access
- Proposed ROW
- Existing ROW

Waters of U.S. and Impacts

- Emergent Wetland
- Forested Wetland
- Open Water/River Channel
- Outline of Potential Impacts*

Non-Waters of U.S.

- Open Water (Man-made Sumps)

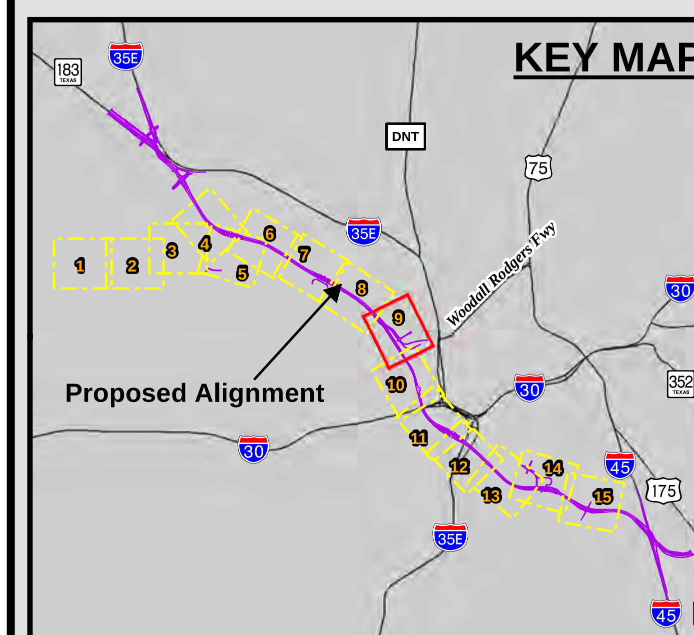
* In some instances, emergent wetland impacts extend beyond excavation areas where loss of wetland function is likely.

N

0 300 600 900
SCALE IN FEET

0 90 180 270
SCALE IN METERS

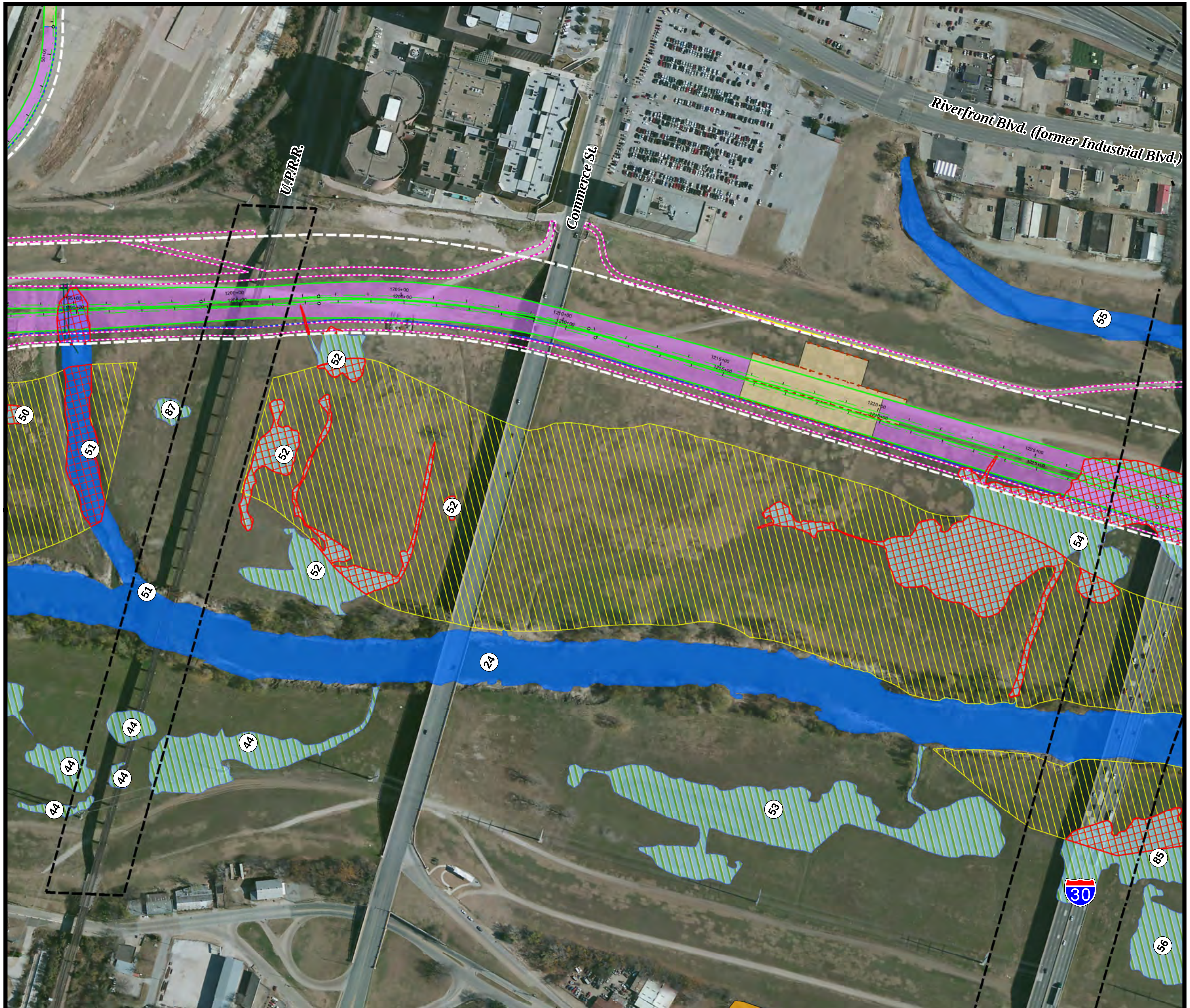
Note: Year of Aerial Photograph: 2011.



APPENDIX G-1, MAP 4 (SHEET 10 OF 15)

POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



Legend

Design Aspects Features

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Diaphragm Wall
- Proposed Flood, Retaining or Security Wall
- Proposed Culvert
- Proposed Edge of Concrete Pavement
- Proposed Excavation Area
- Proposed Road/ Ramp at Grade
- Proposed Bridge
- Proposed Bridge/ Pavement Removal
- Proposed Park Access
- Proposed ROW
- Existing ROW

Waters of U.S. and Impacts

- Emergent Wetland
- Forested Wetland
- Open Water/River Channel
- Outline of Potential Impacts*

Non-Waters of U.S.

- Open Water (Man-made Sumps)

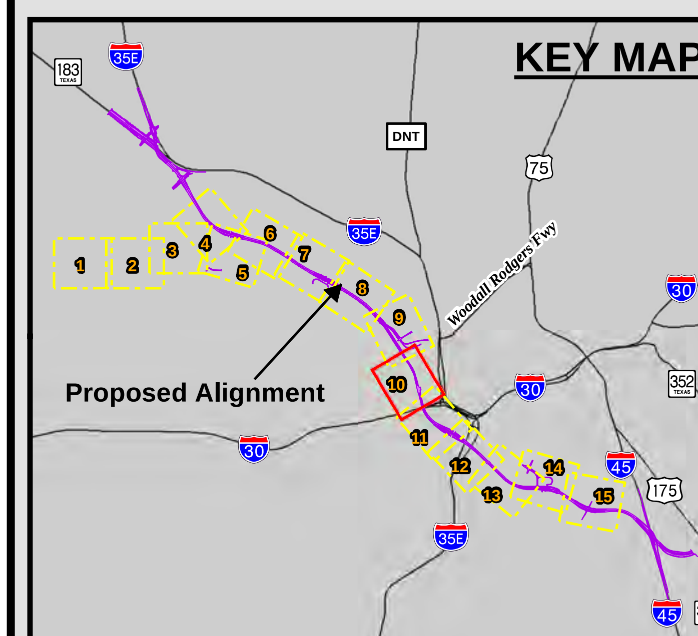
* In some instances, emergent wetland impacts extend beyond excavation areas where loss of wetland function is likely.

N

0 300 600 900
SCALE IN FEET

0 90 180 270
SCALE IN METERS

Note: Year of Aerial Photograph: 2011.

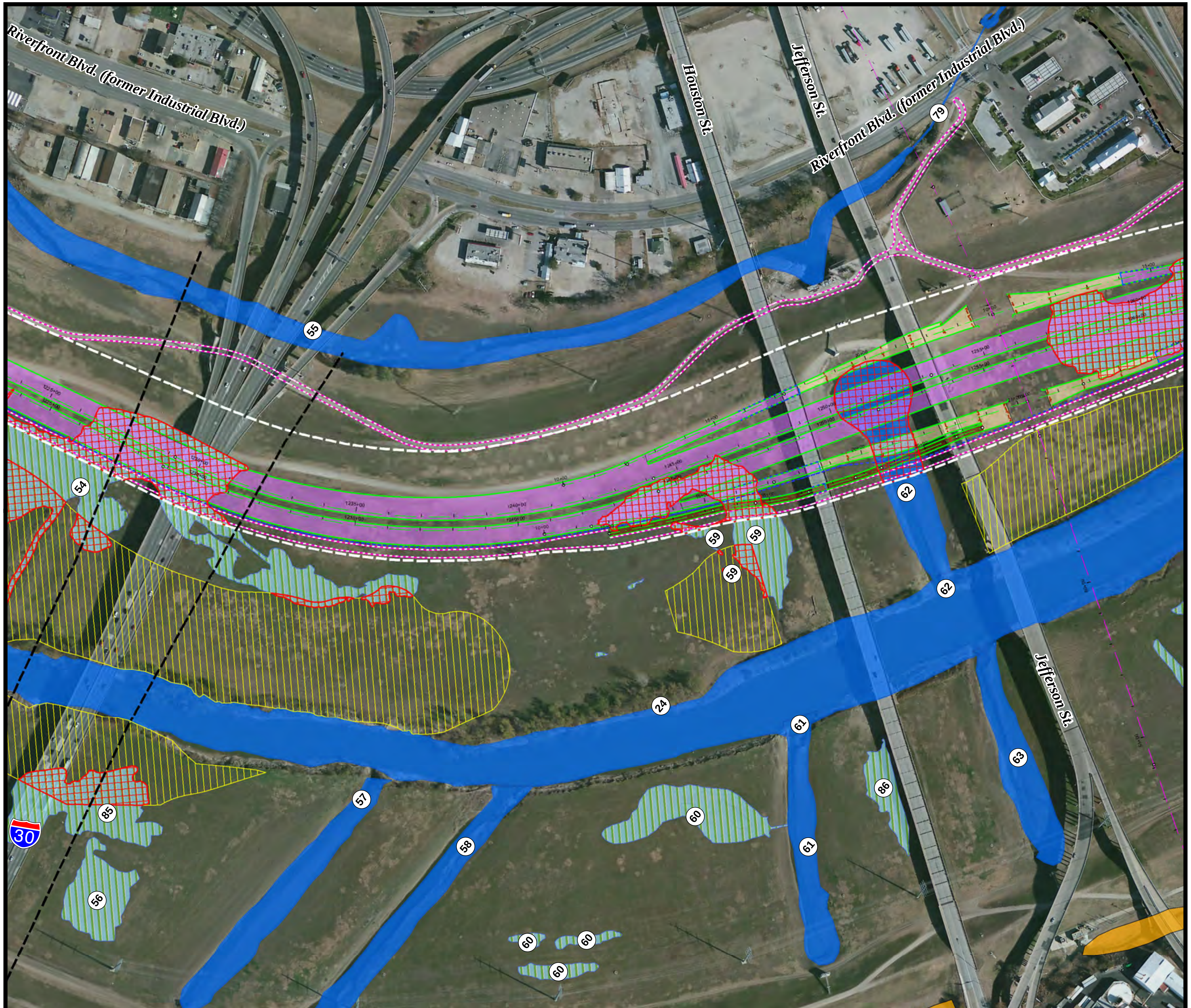


APPENDIX G-1, MAP 4 (SHEET 11 OF 15)

POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

NTTA®

NORTH TEXAS TOLLWAY AUTHORITY



Legend

Design Aspects Features

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Diaphragm Wall
- Proposed Flood, Retaining or Security Wall
- Proposed Culvert
- Proposed Edge of Concrete Pavement
- Proposed Excavation Area
- Proposed Road/ Ramp at Grade
- Proposed Bridge
- Proposed Bridge/ Pavement Removal
- Proposed Park Access
- Proposed ROW
- Existing ROW

Waters of U.S. and Impacts

- Emergent Wetland
- Forested Wetland
- Open Water/River Channel
- Outline of Potential Impacts*

Non-Waters of U.S.

- Open Water (Man-made Sumps)

* In some instances, emergent wetland impacts extend beyond excavation areas where loss of wetland function is likely.

N

0 300 600 900

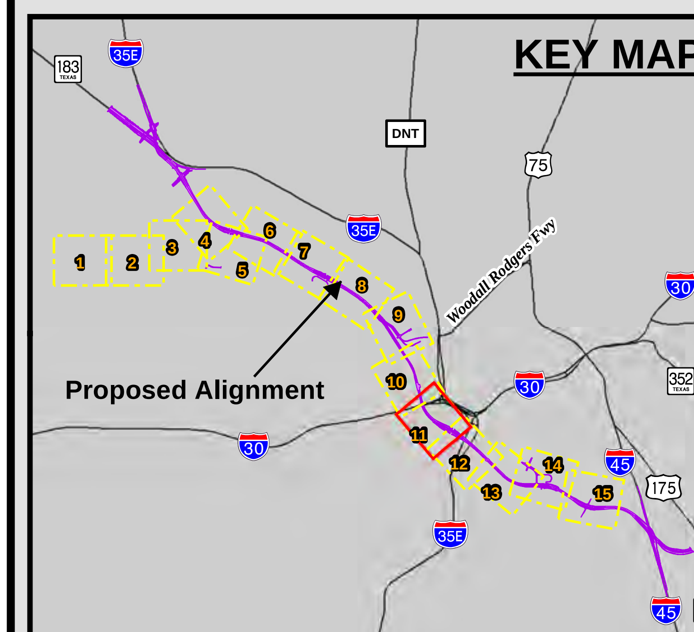
SCALE IN FEET

0 90 180 270

SCALE IN METERS

Note: Year of Aerial Photograph: 2011.

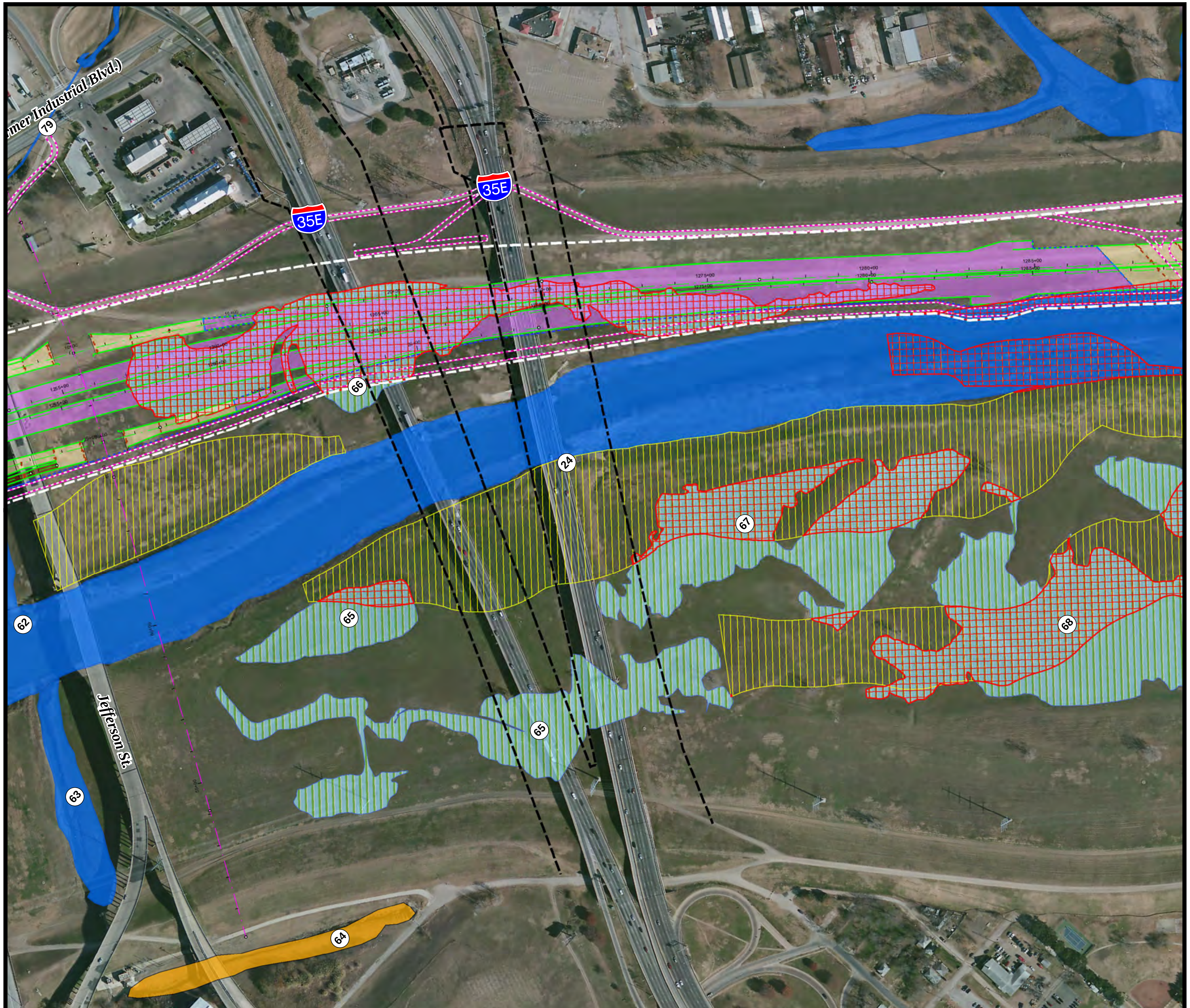
KEY MAP



APPENDIX G-1, MAP 4 (SHEET 12 OF 15)

POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



Legend

Design Aspects Features

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Diaphragm Wall
- Proposed Flood, Retaining or Security Wall
- Proposed Culvert
- Proposed Edge of Concrete Pavement
- Proposed Excavation Area
- Proposed Road/ Ramp at Grade
- Proposed Bridge
- Proposed Bridge/ Pavement Removal
- Proposed Park Access
- Proposed ROW
- Existing ROW

Waters of U.S. and Impacts

- Emergent Wetland
- Forested Wetland
- Open Water/River Channel
- Outline of Potential Impacts*

Non-Waters of U.S.

- Open Water (Man-made Sumps)

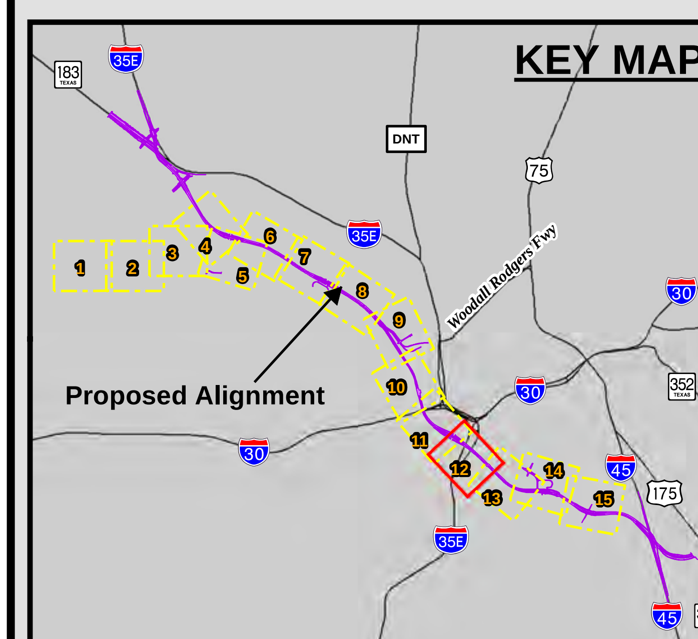
* In some instances, emergent wetland impacts extend beyond excavation areas where loss of wetland function is likely.

0 300 600 900
SCALE IN FEET

0 90 180 270
SCALE IN METERS

Note: Year of Aerial Photograph: 2011.

KEY MAP



APPENDIX G-1, MAP 4 (SHEET 13 OF 15)

POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

NTTA® NORTH TEXAS TOLLWAY AUTHORITY

Legend

Design Aspects Features

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Diaphragm Wall
- Proposed Flood, Retaining or Security Wall
- Proposed Culvert
- Proposed Edge of Concrete Pavement
- Proposed Excavation Area
- Proposed Road/ Ramp at Grade
- Proposed Bridge
- Proposed Bridge/ Pavement Removal
- Proposed Park Access
- Proposed ROW
- Existing ROW

Waters of U.S. and Impacts

- Emergent Wetland
- Forested Wetland
- Open Water/River Channel
- Outline of Potential Impacts*

Non-Waters of U.S.

- Open Water (Man-made Sumps)

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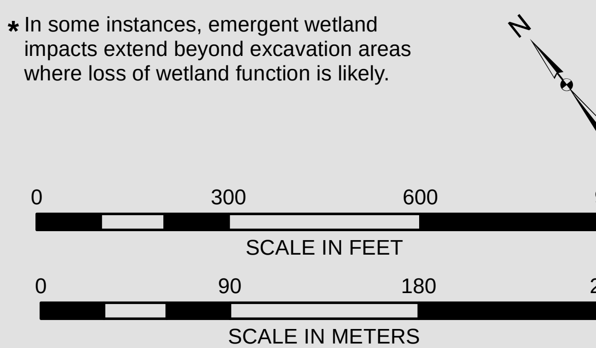
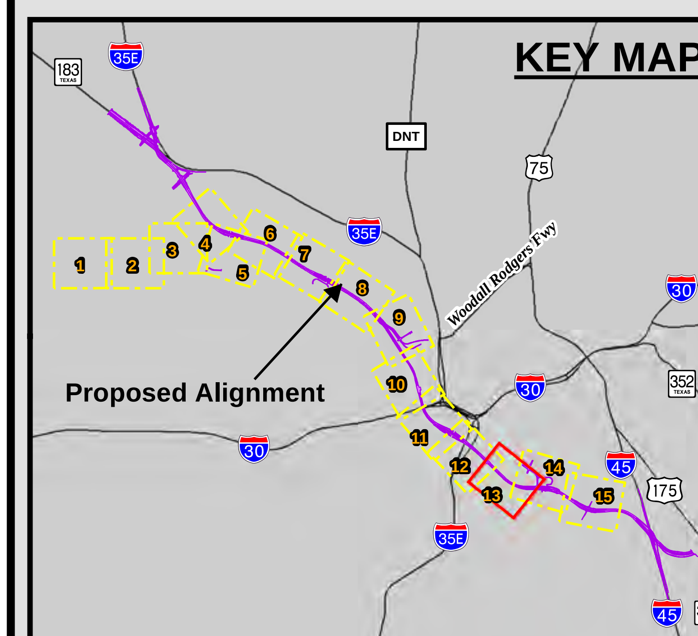


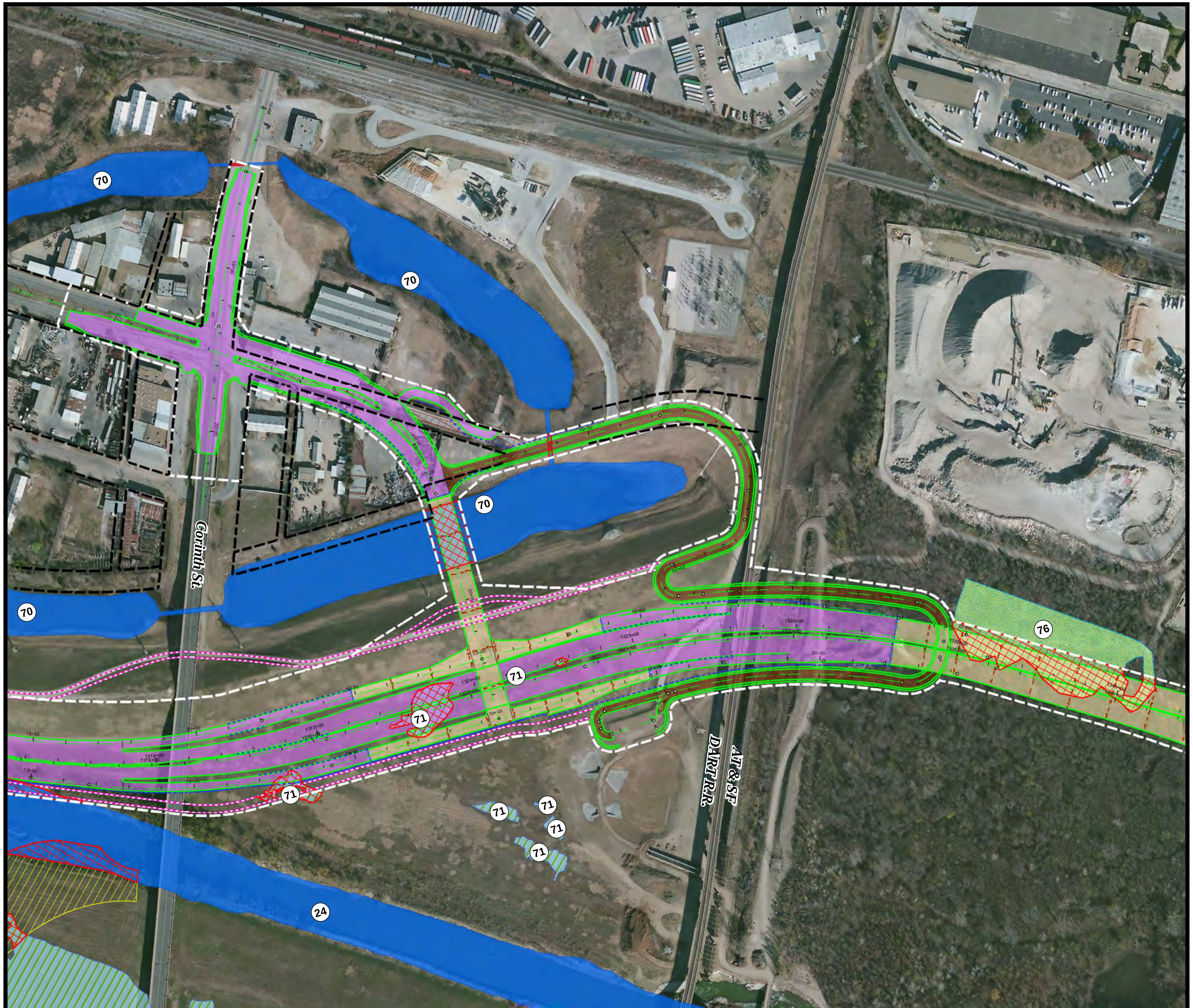
Note: Year of Aerial Photograph: 2011.



APPENDIX G-1, MAP 4 (SHEET 14 OF 15)

POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

NTTA® NORTH TEXAS TOLLWAY AUTHORITY



Legend

Design Aspects Features

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Diaphragm Wall
- Proposed Flood, Retaining or Security Wall
- Proposed Culvert
- Proposed Edge of Concrete Pavement
- Proposed Excavation Area
- Proposed Road/ Ramp at Grade
- Proposed Bridge
- Proposed Bridge/ Pavement Removal
- Proposed Park Access
- Proposed ROW
- Existing ROW

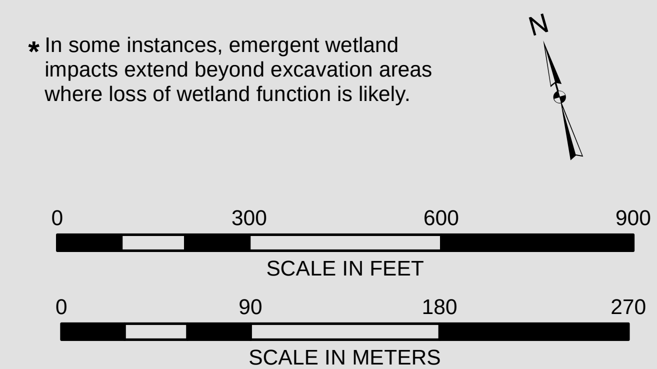
Waters of U.S. and Impacts

- Emergent Wetland
- Forested Wetland
- Open Water/River Channel
- Outline of Potential Impacts*

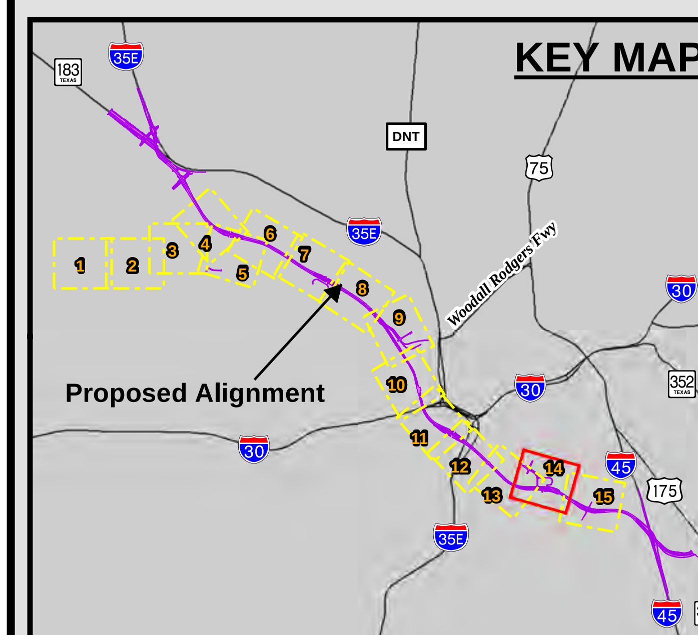
Non-Waters of U.S.

- Open Water (Man-made Sumps)

* In some instances, emergent wetland impacts extend beyond excavation areas where loss of wetland function is likely.



Note: Year of Aerial Photograph: 2011.



APPENDIX G-1, MAP 4 (SHEET 15 OF 15)

POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

NTTA® NORTH TEXAS TOLLWAY AUTHORITY

Legend

Design Aspects Features

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Diaphragm Wall
- Proposed Flood, Retaining or Security Wall
- Proposed Culvert
- Proposed Edge of Concrete Pavement
- Proposed Excavation Area
- Proposed Road/ Ramp at Grade
- Proposed Bridge
- Proposed Bridge/ Pavement Removal
- Proposed Park Access
- Proposed ROW
- Existing ROW

Waters of U.S. and Impacts

- Emergent Wetland
- Forested Wetland
- Open Water/River Channel
- Outline of Potential Impacts*

Non-Waters of U.S.

- Open Water (Man-made Sumps)

* In some instances, emergent wetland impacts extend beyond excavation areas where loss of wetland function is likely.

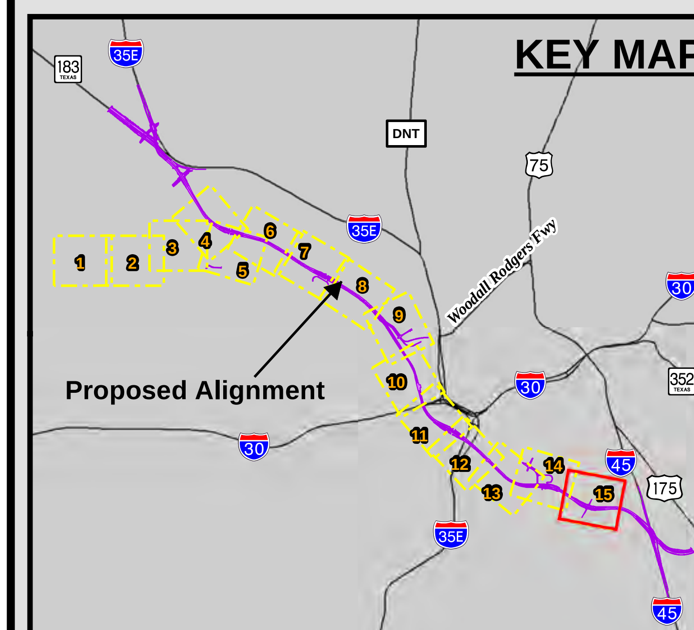
N

0 300 600 900
SCALE IN FEET

0 90 180 270
SCALE IN METERS

Note: Year of Aerial Photograph: 2011.

KEY MAP



APPENDIX G-1, MAP 5

PROPOSED PROJECT BETWEEN IH-35E AND CORINTH

NTTA
NORTH TEXAS TOLLWAY AUTHORITY

Legend

109035 Cross Section

Design Aspects Features

- Operation & Maintenance Road for Levee Control
- Proposed Abutment
- Proposed Bent
- Proposed Flood, Retaining or Security Wall
- Proposed Culvert
- Proposed Edge of Concrete Pavement
- Proposed Excavation Area
- Proposed Road/ Ramp at Grade
- Proposed Bridge
- Proposed Bridge/ Pavement Removal
- Proposed Park Access
- Proposed ROW
- Existing ROW
- Outline of Potential Impacts

Waters of U.S. and Impacts

- Emergent Wetland
- Forested Wetland
- Open Water/River Channel

Non-Waters of U.S.

- Open Water (Man-made Sumps)

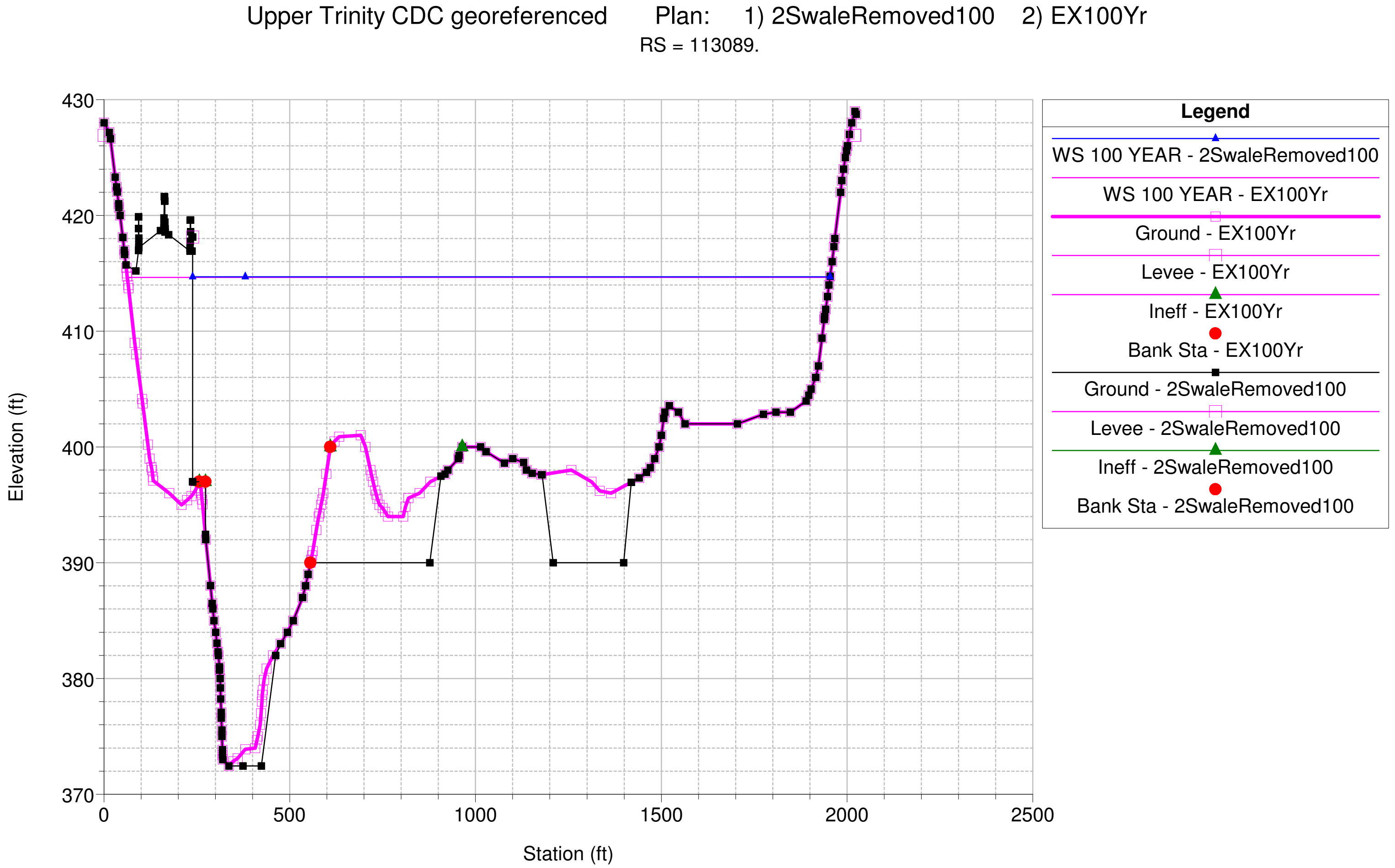
N

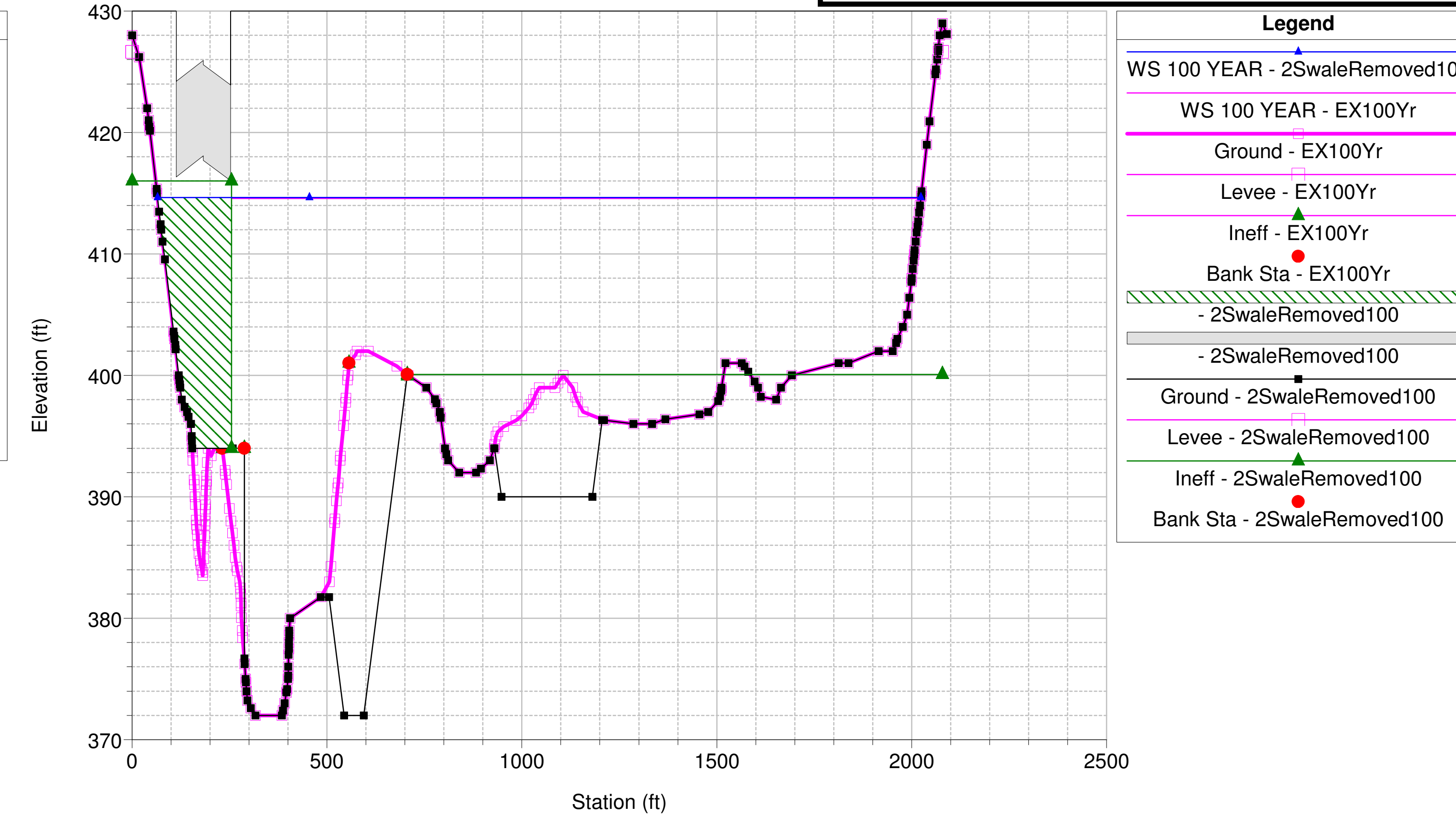
0 500 1,000 1,500
SCALE IN FEET

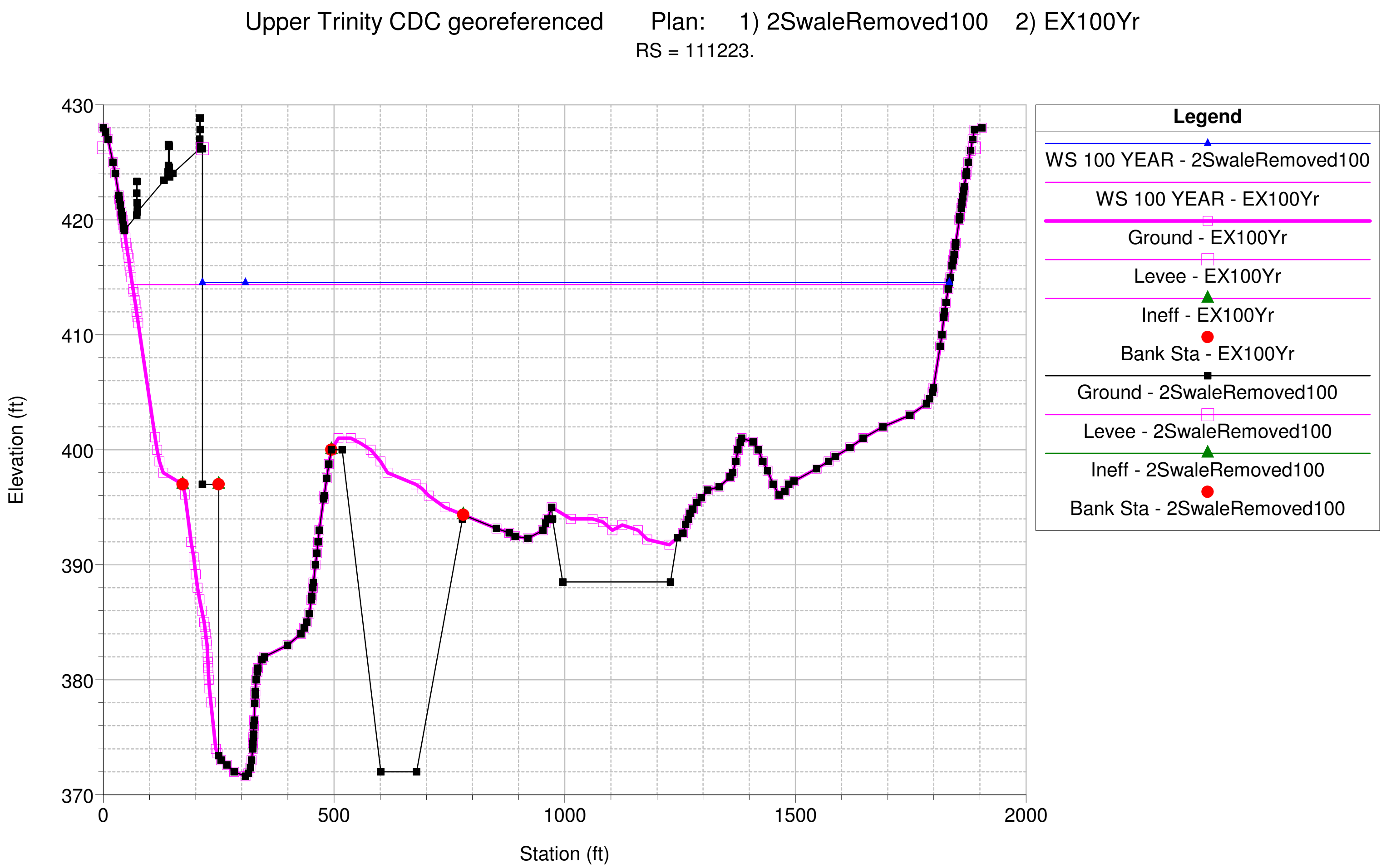
0 150 300 450
SCALE IN METERS

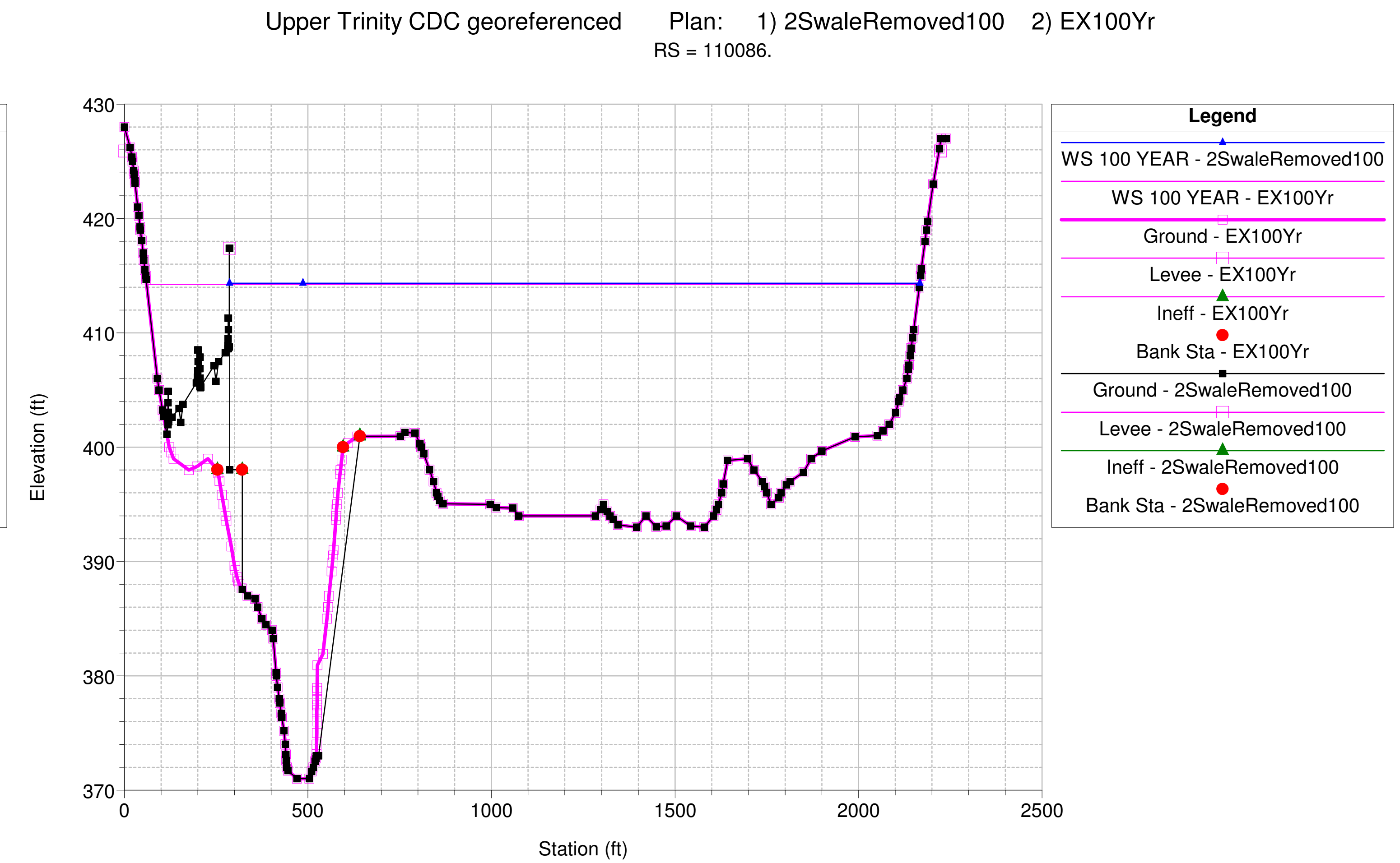
Note: Year of Aerial Photograph: 2011.

EXHIBIT 1 TO APPENDIX G-1, MAP 5
SELECTED FLOODWAY CROSS SECTIONS









Average Channel Velocity Comparison
Corinth to near IH35
1-Year to 100-Year

EXHIBIT 2 TO APPENDIX G-1, MAP 5

AVERAGE CHANNEL VELOCITY COMPARISON

River Sta	Existing Conditions							Proposed Conditions (Trinity Parkway)							Differences						
	1-Year	2-Year	5-Year	10-year	25-Year	50-Year	100-Year	1-Year	2-Year	5-Year	10-year	25-Year	50-Year	100-Year	1-Year	2-Year	5-Year	10-year	25-Year	50-Year	100-Year
	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl	Vel Chnl
	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft/s)	(ft/s)
113405	3.01	3.48	4.36	4.79	5.47	6.01	6.48	2.56	2.99	3.89	4.35	5.06	5.65	6.17	-0.45	-0.49	-0.47	-0.44	-0.41	-0.36	-0.31
113247	2.95	3.39	4.28	4.7	5.35	5.88	6.33	2.55	2.96	3.98	4.43	5.16	5.74	6.25	-0.4	-0.43	-0.3	-0.27	-0.19	-0.14	-0.08
113089	2.92	3.38	4.29	4.71	5.37	5.9	6.35	2.54	2.96	3.98	4.44	5.17	5.75	6.26	-0.38	-0.42	-0.31	-0.27	-0.2	-0.15	-0.09
112933	2.86	3.31	4.22	4.63	5.28	5.81	6.25	2.48	2.9	3.92	4.37	5.08	5.65	6.15	-0.38	-0.41	-0.3	-0.26	-0.2	-0.16	-0.1
112883	2.88	3.32	4.2	4.59	5.22	5.73	6.17	2.42	2.83	3.83	4.26	4.94	5.49	5.96	-0.46	-0.49	-0.37	-0.33	-0.28	-0.24	-0.21
112783	3.14	3.34	4.15	4.55	5.18	5.69	6.12	2.53	3.08	4	4.48	5.22	5.82	6.34	-0.61	-0.26	-0.15	-0.07	0.04	0.13	0.22
112633	3.12	3.3	4.09	4.48	5.1	5.6	6.02	2.58	3.04	3.96	4.44	5.19	5.79	6.31	-0.54	-0.26	-0.13	-0.04	0.09	0.19	0.29
112473	2.79	3.22	4.04	4.46	5.12	5.65	6.1	2.35	2.77	3.66	4.15	4.9	5.5	6.03	-0.44	-0.45	-0.38	-0.31	-0.22	-0.15	-0.07
112314	2.7	3.15	3.97	4.39	5.06	5.59	6.05	1.91	2.27	3	3.41	4.07	4.6	5.07	-0.79	-0.88	-0.97	-0.98	-0.99	-0.99	-0.98
112127	2.68	2.84	3.6	4.01	4.63	5.14	5.58	1.77	2.09	2.78	3.17	3.78	4.27	4.71	-0.91	-0.75	-0.82	-0.84	-0.85	-0.87	-0.87
111940	2.46	2.86	3.64	4.06	4.73	5.27	5.73	1.79	2.09	2.72	3.08	3.64	4.1	4.5	-0.67	-0.77	-0.92	-0.98	-1.09	-1.17	-1.23
111754	2.66	3.07	3.89	4.33	5.02	5.59	6.08	1.72	2.03	2.7	3.09	3.7	4.21	4.66	-0.94	-1.04	-1.19	-1.24	-1.32	-1.38	-1.42
111577	2.8	3.22	4.05	4.5	5.21	5.79	6.29	1.76	2.07	2.77	3.18	3.82	4.35	4.82	-1.04	-1.15	-1.28	-1.32	-1.39	-1.44	-1.47
111400	2.94	3.37	4.22	4.66	5.37	5.94	6.44	1.81	2.14	2.85	3.26	3.91	4.44	4.92	-1.13	-1.23	-1.37	-1.4	-1.46	-1.5	-1.52
111223	2.81	3.23	4.08	4.51	5.21	5.77	6.26	1.74	2.06	2.75	3.15	3.77	4.28	4.75	-1.07	-1.17	-1.33	-1.36	-1.44	-1.49	-1.51
111076	2.59	2.99	3.76	4.17	4.85	5.39	5.87	1.7	2.01	2.68	3.08	3.7	4.21	4.67	-0.89	-0.98	-1.08	-1.09	-1.15	-1.18	-1.2
110929	2.56	2.94	3.72	4.14	4.8	5.35	5.82	1.77	2.09	2.78	3.18	3.82	4.34	4.82	-0.79	-0.85	-0.94	-0.96	-0.98	-1.01	-1
110783	2.72	3.12	3.92	4.33	4.99	5.53	6	1.76	2.09	2.78	3.19	3.82	4.34	4.81	-0.96	-1.03	-1.14	-1.14	-1.17	-1.19	-1.19
110626	2.53	2.91	3.64	4.02	4.65	5.17	5.61	1.79	2.12	2.82	3.23	3.87	4.4	4.88	-0.74	-0.79	-0.82	-0.79	-0.78	-0.77	-0.73
110470	3.46	3.04	3.77	4.15	4.78	5.29	5.73	1.4	1.69	2.31	2.68	3.27	3.76	4.21	-2.06	-1.35	-1.46	-1.47	-1.51	-1.53	-1.52
110342	3.44	3.07	3.79	4.16	4.77	5.27	5.7	1.77	2.11	2.82	3.24	3.9	4.44	4.92	-1.67	-0.96	-0.97	-0.92	-0.87	-0.83	-0.78
110214	3.45	3.11	3.81	4.18	4.78	5.28	5.7	2.51	2.89	3.69	4.13	4.83	5.4	5.89	-0.94	-0.22	-0.12	-0.05	0.05	0.12	0.19
110086	2.69	3.09	3.78	4.13	4.71	5.18	5.58	3.3	3.06	3.84	4.24	4.9	5.43	5.88	0.61	-0.03	0.06	0.11	0.19	0.25	0.3
110009	2.94	3.29	3.97	4.3	4.87	5.33	5.72	3.11	3.48	4.24	4.62	5.25	5.76	6.19	0.17	0.19	0.27	0.32	0.38	0.43	0.47
109983	Corinth Street Bridge							Corinth Street Bridge							Corinth Street Bridge						
109957	2.95	3.33	4.03	4.37	4.94	5.4	5.78	3.06	3.46	4.25	4.64	5.28	5.8	6.23	0.11	0.13	0.22	0.27	0.34	0.4	0.45

FEIS APPENDIX G-1

COST EXHIBITS

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FEIS APPENDIX G-1: COST EXHIBITS

CONTENTS

INTRODUCTION

The **Cost Exhibits** listed above were used to develop comparative cost estimates based on project construction costs combined with ROW and utility relocation costs, expressed in terms of cost per mainlane miles. All cost estimates have been adjusted to reflect 2011 dollars from the original year of the cost estimate. **Cost Exhibit 1** includes two summary tables showing how source information was adjusted to reflect 2011 dollars. Annotations have been added to **Cost Exhibits 2 – 8** to assist in identifying the calculations made in developing the data in **Tables G-1-1** through **G-1-3**.

The details in the cost estimate formats vary somewhat, and adjustments were necessary to ensure the greatest level of comparability between the project estimates. For example, utility relocation costs are included in construction costs for the PGBT Segment IV project; consequently, utility relocation costs were backed out of construction costs and combined with ROW cost estimates to achieve uniformity of cost reporting. In general, cost estimates for projects in the planning stages represent the best good-faith estimate from design professionals familiar with the highway construction industry. However, persons preparing cost estimates do not have control over the variables affecting those estimates that may change such as the following: labor, materials, or equipment costs; the contractors' methods of determining bid prices; competitive bidding; market or negotiating conditions.

Specific adjustments were made to the Trinity Parkway alternatives (**Cost Exhibits 2 – 4**) in keeping with USACE guidance for completing a 404 practicability analysis. This included removing the cost of ecological mitigation from the "Environmental Mitigation" line item in the cost estimates. Other mitigation costs associated with hazardous materials investigations and asbestos surveys related to building demolition remain in the construction cost estimates. In addition, the engineering estimate of ROW costs includes an allowance for the cost of building demolition; however, as the environmental mitigation costs in the Trinity Parkway LSS included an allowance for building demolition costs, this redundant aspect of Environmental Mitigation costs has also been removed.

Cost Exhibit 1

SUMMARY COST TABLES FOR PROJECTS EVALUATED

Trinity Parkway FEIS

Project Feature	Trinity Parkway Alternatives - LSS			Trinity Parkway - FEIS	
	2A (2011 $)	2B (2011 $)	3C (2011 $)	3C (2013 $)	3C (2011 $)
Construction ($)	$ 1,394,263,521	$ 1,068,437,757	$ 1,014,137,614	$ 934,466,656	$ 867,486,930
ROW/Utility ($)	$ 593,002,865	$ 512,354,710	$ 142,056,826	$ 145,745,297	$ 145,745,297
Total Cost ($)	$ 1,987,266,386	$ 1,580,792,467	$ 1,156,194,440	$ 1,080,211,953	$1,013,232,227
Approximate Lane Miles (ln-mile)	52.8	52.8	52.8	-	52.8
Total Cost/Lane-Mile ($/ln-mile)	$ 37,637,621	$ 29,939,251	$ 21,897,622	-	$ 19,190,004

Project Feature	President George Bush Turnpike (PGBT)						C Chavez Border Highway West	
	Segment IV (2006 $)	Segment IV (2011 $)	E-Extension (Sec 28-32) (2013 $)	E-Extension (Sec 28-32) (2011 $)	W-Extension (Phase 4) (2013 $)	W-Extension (Phase 4) (2011 $)	BHW (2012 $)	CCBHW (2011 $)
Construction ($)	$ 218,992,000	$ 256,258,217	$ 607,606,344	$ 564,054,970	$ 468,657,630	$ 404,478,678	$ 484,400,000	$ 464,799,691
ROW/Utility ($)	$ 45,916,800	$ 45,916,800	$ 125,081,237	$ 125,081,237	$ 1,752,525	$ 1,752,525	$ 147,800,000	$ 147,800,000
Total Cost ($)	$ 264,908,800	$ 302,175,017	$ 732,687,581	$ 689,136,207	$ 470,410,155	$ 406,231,203	$ 632,200,000	$ 612,599,691
Approximate Lane Miles (ln-mile)	-	31.8	-	59.4	-	39.0	-	33.1
Total Cost/Lane-Mile ($/ln-mile)	-	$ 9,502,359	-	$ 11,601,620	-	$ 10,416,185	-	$ 18,518,733

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Cost Exhibit 2

TOTAL PROJECT COST
TRINITY PARKWAY - ALT 2A
IH 35E TO US 175 (9.9 MILES) / SIX GP LANES (ULTIMATE SECTION)

PRELIMINARY/CONCEPTUAL ESTIMATE OF PROBABLE COSTS OF CONSTRUCTION

LEVEL "E" SCHEMATIC PHASE ESTIMATE

Version ________

Created By:	JWM
Date:	3/1/2011
Checked by:	MGC
Date:	1/4/2012
Official Estimate Date:	3/1/2011
Mid-point of Anticipated Construction:	7/1/2017
Anticipated Construction Duration:	

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
1.0 ROADWAY					
1.01 A	Mainlane Pavement	24,240	SY	$ 70	$ 1,696,800
1.01 B	Asphalt Shoulders	28,500	SY	$ 50	$ 1,425,000
1.02	Frontage Road Pavement	220,122	SY	$ 70	$ 15,408,540
1.03	Ramp Pavement	25,682	SY	$ 70	$ 1,797,740
1.04	Cross Street Pavement	0	SY	$ 70	$ -
1.05	Monolithic Curb	52,270	LF	$ 2	$ 104,540
1.06	Pavement Striping (Solid)	397,780	LF	$ 2	$ 795,560
1.07	Pavement Striping (Broken)	85,550	LF	$ 2	$ 171,100
1.08	Concrete Traffic Barrier	43,520	LF	$ 50	$ 2,176,000
1.09	Excavation	9,120	CY	$ 5	$ 45,600
1.10	Embankment	267,500	CY	$ 10	$ 2,675,000
1.11	Embankment (Borrow)	113,000	CY	$ 15	$ 1,695,000
SUBTOTAL ROADWAY					**$ 27,990,880**
2.0 STRUCTURES					
2.01	Main Lane Bridge (Standard)	475,680	SF	$ 60	$ 28,540,800
2.02	Main Lane Bridge (Special)	5,247,120	SF	$ 95	$ 498,476,400
2.03	Frontage Road Bridge (Standard)	0	SF	$ 60	$ -
2.04	Frontage Road Bridge (Special)	0	SF	$ 95	$ -
2.05	Ramp Bridge (Standard)	175,360	SF	$ 60	$ 10,521,600
2.06	Ramp Bridge (Special)	1,130,500	SF	$ 95	$ 107,397,500
2.07	Cross Street Bridge	0	SF	$ 60	$ -
2.08	Retaining Wall (Cut)	0	SF	$ 42	$ -
2.09	Retaining Wall (Fill)	373,270	SF	$ 35	$ 13,064,450
2.10	Flood Wall	0	SF	$ 50	$ -
2.11	Park Access Bridge	0	SF	$ 56	$ -
2.12	Pedestrian Access Bridge	0	SF	$ 54	$ -
2.13	Reunion Pedestrian Platform	0	EA	$ 7,748,810	$ -
2.14	Bridge Widening (Standard)	9,360	SF	$ 90	$ 842,400
2.15	Bridge Widening (Special)	860,175	SF	$ 130	$ 111,822,750
SUBTOTAL STRUCTURES					**$ 770,665,900**
3.0 DRAINAGE					
3.01	Drainage	547	STA	$ 25,000	$ 13,675,000
3.02	Storm Drainage Lift Station	0	EA	$ 263,000	$ -
3.03	Large Drainage Structures	6,000	LF	$ 500	$ 3,000,000
3.04	Extend Pump Station/Sewer Outfall	0	EA	$ 817,500	$ -
SUBTOTAL DRAINAGE					**$ 16,675,000**
4.0 MISCELLANEOUS					
4.01 A	Demolition - Bridge Structure (0'-99')	0	EA	$ 15,000	$ -
4.01 B	Demolition - Bridge Structure (100'-499')	0	EA	$ 40,000	$ -
4.01 C	Demolition - Bridge Structure (500'-999')	3	EA	$ 100,000	$ 300,000
4.01 D	Demolition - Bridge Structure (>999')	0	EA	$ 200,000	$ -
4.02	Demolition - Pavement	220,987	SY	$ 5	$ 1,104,935
4.03	Sodding including Top Soil	85,660	SY	$ 3	$ 256,980
4.04	Intersection Signalization	19	EA	$ 150,000	$ 2,850,000
4.05	Signage	547	STA	$ 20,000	$ 10,940,000
4.06	Lighting	547	STA	$ 10,000	$ 5,470,000
4.07	Landscape	10	MI.	$ 1,000,000	$ 10,000,000

Cost Exhibit 2

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
4.08	SWP3	547	STA	$ 10,000	$ 5,470,000
4.09	R.O.W. Fence	104,544	LF	$ 15	$ 1,568,160
4.10	Environmental Mitigation	1	LS	$ 48,208,400	$ 48,208,400
4.11	Mow Strip	154,176	LF	$ 25	$ 3,854,400
4.12	Concrete Sidewalk	31,556	SY	$ 35	$ 1,104,460
4.13	R.O.W. Prep	547	STA	$ 25,000	$ 13,675,000
4.14	Traffic Control (Urban)	547	STA	$ 200,000	$ 109,400,000
4.15	Traffic Control (Floodway)	0	STA	$ 5,000	$ -
4.16	Wick Drains	70	AC	$ 100,000	$ 7,000,000
SUBTOTAL MISCELLANEOUS					**$ 221,202,335**

Less $6,946,600 for ecological mitigation

5.0 GANTRIES

5.01	ETC Mainlane Gantry	4	Each	$ 1,000,000	$ 4,000,000
5.02	ETC Ramp Gantry	12	Each	$ 300,000	$ 3,600,000
SUBTOTAL Gantries					**$ 7,600,000**

6.0 MAINTENANCE FACILITIES

***	Maintenance Facilities	1	EA	$ 10,000,000	$ 10,000,000
***	Sand Stockpile	1	EA	$ 1,200,000	$ 1,200,000
***	Asset Data Management	1	EA	$ 100,000	$ 100,000
SUBTOTAL MAINTENANCE FACILITIES					**$ 11,300,000**

CONSTRUCTION COST SUMMARY

SUBTOTAL CONSTRUCTION	**$ 1,055,434,115**
Mobilization (10%)	**$ 105,543,412**
Subtotal Construction	**$ 1,160,977,527**
Construction Contingency (20%)	**$ 232,195,506**
TOTAL CONSTRUCTION COST (CURRENT DOLLARS)	**$ 1,393,173,033**
ESCALATED TOTAL CONSTRUCTION COST TO MID-POINT OF CONSTRUCTION (ENR CCI PROJECTION)	**$ 1,762,808,335**

1.10 x 1.20 = 1.32

7.0 ITS

7.01	CCTV	20	Each	$ 30,000	$ 600,000
7.02	Dynamic Messaging Sign	4	Each	$ 250,000	$ 1,000,000
7.03	Pavement Sensors	2	Each	$ 20,000	$ 40,000
7.04	AVI Travel Time Sensors	20	Each	$ 15,000	$ 300,000
7.05	Electronic Tolling Equipment	40	Lane	$ 80,000	$ 3,200,000
7.06	Fiber Optic (2 Operational Conduits)	9	Mile	$ 300,000	$ 2,610,000
7.07	Signage	40	Lane	$ 20,000	$ 800,000
SUBTOTAL ITS					**$ 8,550,000**
CONTINGENCY (20%)					**$ 1,710,000**
SUBTOTAL ITS COST					**$ 10,260,000**
ESCALATED TOTAL ITS COST TO MID-POINT OF CONSTRUCTION					**$ 12,982,173**

Total:
$1,403,433,033
(-$6,946,600 x 1.32)
$1,394,263,521

8.0 R.O.W. & UTILITIES

8.01	Land and Displacement(Acquisitions, relocations, demolition, fees)				$ 510,806,437
8.02 A	Relocate Small Utility Lines (<8")	32,449	LF	$ 90	$ 2,920,410
8.02 B	Relocate Medium Utility Lines (10"-21")	27,499	LF	$ 200	$ 5,499,800
8.02 C	Relocate Large Utility Lines (24"-42")	13,749	LF	$ 390	$ 5,362,110
8.02 D	Relocate Small Drainage Lines (<18")	32,449	LF	$ 120	$ 3,893,880
8.02 E	Relocate Medium Drainage Lines (21"-42")	27,499	LF	$ 190	$ 5,224,810
8.02 F	Relocate Large Drainage Lines (48"-72")	14,049	LF	$ 370	$ 5,198,130
8.02 G	Relocate Fiber Optics Line	27,499	LF	$ 250	$ 6,874,750
8.02 H	Relocate Transmission Tower	2	EA	$ 400,000	$ 800,000
8.02 I	Adjust Transmission Tower	58	EA	$ 400,000	$ 23,200,000
8.02 J	Relocate U/G Electric Distribution Line	22,549	LF	$ 200	$ 4,509,800
8.02 K	Relocate Overhead Transmission Line	8,000	LF	$ 210	$ 1,680,000
8.02 L	Relocate Electric Substation	1	EA	$ 10,000,000	$ 10,000,000
8.02 M	Utility Contingencies (20%)	1	LS	$15,032,738.0	$ 15,032,738
SUBTOTAL R.O.W. & UTILITIES					**$ 601,002,865**

Less $8,000,000 (20 Oncor towers at $400,000 each)

-$8,000,000 = $593,002,865

9.0 SOFT COST

Subtotal Construction Cost		**$ 1,393,173,033**
9.01	**Administrative**	
	GEC / PMO (2.25%)	**$ 31,346,393**

Cost Exhibit 2

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
	Corridor Management (2.5%)				$ 34,829,326
	Legal Consulting Fees (0.5%)				$ 6,965,865
9.02	**Planning**				
	Feasibility Studies & Advanced Planning (0.75%)				$ 10,448,798
	Cost of Finance (0.75%)				$ 10,448,798
	EIS/EA Schematic (0.5%)				$ 6,965,865
9.03	**Design**				
	PS&E (6.5%) (DSE, geotechnical, pavement, landscaping, MSE wall design)				$ 90,556,247
	Surveying (0.25%)				$ 3,482,933
9.04	**R.O.W. Acquisition Consultant (1.5%) (RAT Team, asbestos insp. & abatement)**				$ 20,897,595
9.05	**Construction Support**				
	Construction Management (6.75%)				$ 94,039,180
	Materials Testing & Environmental Compliance (1.25%)				$ 17,414,663
	Wall Engineer (0.25%)				$ 3,482,933
	Independent Assurance (0.75%)				$ 10,448,798
9.06	**Reimbursements (1%)**				$ 13,931,730
9.07	**Special Services Consultant**				$ -
9.08	**Unique Features (historic sites, wetlands) - Optional**				$ -
Subtotal Soft Cost					$ 355,259,124
ESCALATED TOTAL SOFT COST TO MID-POINT OF CONSTRUCTION					$ 449,516,126

TOTAL PROJECT COST SUMMARY (CURRENT DOLLARS)

Total Construction Cost		$ 1,393,173,033
Total ITS Cost		$ 10,260,000
Total R.O.W. & Utilities		$ 601,002,865
Total Soft Cost		$ 355,259,124
TOTAL PROJECT COST (CURRENT DOLLARS)		$ 2,359,695,022
	SAY	$ 2,359,696,000

TOTAL PROJECT COST SUMMARY (ESCALATED)

Escalated Total Construction Cost		$ 1,762,808,335
Escalated Total ITS		$ 12,982,173
Total R.O.W. & Utilities		$ 601,002,865
Escalated Total Soft Cost		$ 449,516,126
TOTAL PROJECT COST (ESCALATED)		$ 2,826,309,499
	SAY	$ 2,826,310,000

REPORTING COST DISTRIBUTION

Professional Services		$ 92,547,438
Planning		$ 35,256,167
Design		$ 118,989,563
Other		$ 17,628,083
Gantries		$ 10,578,067
ITS		$ 12,982,173
Right-of-Way and Utilities		$ 627,444,990
Construction Management		$ 158,652,750
Construction/Installation		$ 1,442,700,962
Construction Contingency		$ 293,801,389
Maintenance Facilities		$ 15,727,915
TOTAL PROJECT COST		$ 2,826,309,497
	SAY	$ 2,826,310,000

Notes:

1) The unit costs to construct this facility are based on the unit prices of recently constructed similar facilities and/or the latest average unit prices of TxDOT projects.
2) Preliminary horizontal and vertical alignments are developed. Approximate quantities of major roadway and structure elements can be calculated.
3) Proposed drainage and utilities elements are not developed and quantities are not calculated individually yet.
4) Major above surface utility relocations could be identified (i.e. electric transmission lines, telephone poles, etc).
5) Approximate right-of-way needs can be estimated.
6) Approximate ITS elements needs can be identified.
7) Unit costs of similar projects are used to calculate construction cost.
8) Contingencies are applied to construction and ITS cost.
9) The proposed Jefferson Street Bridge replacement is a TxDOT project and therefore not included in this cost estimate.

Level "E" Estimate 1/4/2012

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Cost Exhibit 3

TOTAL PROJECT COST
TRINITY PARKWAY - ALT 2B
IH 35E TO US 175 (9.9 MILES) / SIX GP LANES (ULTIMATE SECTION)

PRELIMINARY/CONCEPTUAL ESTIMATE OF PROBABLE COSTS OF CONSTRUCTION

LEVEL "E" SCHEMATIC PHASE ESTIMATE

Version _______

Created By:	JWM
Date:	3/1/2011
Checked by:	MGC
Date:	1/4/2012
Official Estimate Date:	3/1/2011
Mid-point of Anticipated Construction:	7/1/2017
Anticipated Construction Duration:	

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
1.0 ROADWAY					
1.01 A	Mainlane Pavement	237,740	SY	$ 70	$ 16,641,800
1.01 B	Asphalt Shoulders	73,394	SY	$ 50	$ 3,669,700
1.02	Frontage Road Pavement	252,250	SY	$ 70	$ 17,657,500
1.03	Ramp Pavement	15,493	SY	$ 70	$ 1,084,510
1.04	Cross Street Pavement	0	SY	$ 70	$ -
1.05	Monolithic Curb	119,600	LF	$ 2	$ 239,200
1.06	Pavement Striping (Solid)	421,270	LF	$ 2	$ 842,540
1.07	Pavement Striping (Broken)	83,600	LF	$ 2	$ 167,200
1.08	Concrete Traffic Barrier	99,370	LF	$ 50	$ 4,968,500
1.09	Excavation	180,200	CY	$ 5	$ 901,000
1.10	Embankment	1,057,460	CY	$ 10	$ 10,574,600
1.11	Embankment (Borrow)	226,000	CY	$ 15	$ 3,390,000
SUBTOTAL ROADWAY					**$ 60,136,550**
2.0 STRUCTURES					
2.01	Main Lane Bridge (Standard)	679,680	SF	$ 60	$ 40,780,800
2.02	Main Lane Bridge (Special)	3,091,920	SF	$ 95	$ 293,732,400
2.03	Frontage Road Bridge (Standard)	0	SF	$ 60	$ -
2.04	Frontage Road Bridge (Special)	0	SF	$ 95	$ -
2.05	Ramp Bridge (Standard)	380,080	SF	$ 60	$ 22,804,800
2.06	Ramp Bridge (Special)	817,000	SF	$ 95	$ 77,615,000
2.07	Cross Street Bridge	0	SF	$ 60	$ -
2.08	Retaining Wall (Cut)	0	SF	$ 42	$ -
2.09	Retaining Wall (Fill)	423,450	SF	$ 35	$ 14,820,750
2.10	Flood Wall	0	SF	$ 50	$ -
2.11	Park Access Bridge	0	SF	$ 56	$ -
2.12	Pedestrian Access Bridge	0	SF	$ 54	$ -
2.13	Reunion Pedestrian Platform	0	EA	$ 7,748,810	$ -
2.14	Bridge Widening (Standard)	9,360	SF	$ 90	$ 842,400
2.15	Bridge Widening (Special)	264,150	SF	$ 130	$ 34,339,500
SUBTOTAL STRUCTURES					**$ 484,935,650**
3.0 DRAINAGE					
3.01	Drainage	546	STA	$ 25,000	$ 13,650,000
3.02	Storm Drainage Lift Station	2	EA	$ 263,000	$ 526,000
3.03	Large Drainage Structures	6,400	LF	$ 500	$ 3,200,000
3.04	Extend Pump Station/Sewer Outfall	0	EA	$ 817,500	$ -
SUBTOTAL DRAINAGE					**$ 17,376,000**
4.0 MISCELLANEOUS					
4.01 A	Demolition - Bridge Structure (0'-99')	0	EA	$ 15,000	$ -
4.01 B	Demolition - Bridge Structure (100'-499')	0	EA	$ 40,000	$ -
4.01 C	Demolition - Bridge Structure (500'-999')	1	EA	$ 100,000	$ 100,000
4.01 D	Demolition - Bridge Structure (>999')	1	EA	$ 200,000	$ 200,000
4.02	Demolition - Pavement	289,867	SY	$ 5	$ 1,449,335
4.03	Sodding including Top Soil	85,660	SY	$ 3	$ 256,980
4.04	Intersection Signalization	19	EA	$ 150,000	$ 2,850,000
4.05	Signage	546	STA	$ 20,000	$ 10,920,000
4.06	Lighting	546	STA	$ 10,000	$ 5,460,000
4.07	Landscape	10	MI.	$ 1,000,000	$ 9,700,000

Cost Exhibit 3

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
4.08	SWP3	546	STA	$ 10,000	$ 5,460,000
4.09	R.O.W. Fence	104,544	LF	$ 15	$ 1,568,160
4.10	Environmental Mitigation	1	LS	$ 45,238,800	$ 45,238,800
4.11	Mow Strip	154,176	LF	$ 25	$ 3,854,400
4.12	Concrete Sidewalk	66,444	SY	$ 35	$ 2,325,540
4.13	R.O.W. Prep	546	STA	$ 25,000	$ 13,650,000
4.14	Traffic Control (Urban)	546	STA	$ 200,000	$ 109,200,000
4.15	Traffic Control (Floodway)	0	STA	$ 5,000	$ -
4.16	Wick Drains	140	AC	$ 100,000	$ 14,000,000
SUBTOTAL MISCELLANEOUS					**$ 226,233,215**

Less $5,931,600 for ecological mitigation

5.0 GANTRIES

5.01	ETC Mainlane Gantry	4	Each	$ 1,000,000	$ 4,000,000
5.02	ETC Ramp Gantry	12	Each	$ 300,000	$ 3,600,000
SUBTOTAL Gantries					**$ 7,600,000**

6.0 MAINTENANCE FACILITIES

***	Maintenance Facilities	1	EA	$ 10,000,000	$ 10,000,000
***	Sand Stockpile	1	EA	$ 1,200,000	$ 1,200,000
***	Asset Data Management	1	EA	$ 100,000	$ 100,000
SUBTOTAL MAINTENANCE FACILITIES					**$ 11,300,000**

CONSTRUCTION COST SUMMARY

SUBTOTAL CONSTRUCTION	**$ 807,581,415**
Mobilization (10%)	**$ 80,758,142**
Subtotal Construction	**$ 888,339,557**
Construction Contingency (20%)	**$ 177,667,912**
TOTAL CONSTRUCTION COST (CURRENT DOLLARS)	**$ 1,066,007,469**
ESCALATED TOTAL CONSTRUCTION COST TO MID-POINT OF CONSTRUCTION (ENR CCI PROJECTION)	**$ 1,348,839,524**

1.10 x 1.20 = 1.32

Total:
$1,076,267,469
(-$5,931,600 x 1.32)
$1,068,437,757

7.0 ITS

7.01	CCTV	20	Each	$ 30,000	$ 600,000
7.02	Dynamic Messaging Sign	4	Each	$ 250,000	$ 1,000,000
7.03	Pavement Sensors	2	Each	$ 20,000	$ 40,000
7.04	AVI Travel Time Sensors	20	Each	$ 15,000	$ 300,000
7.05	Electronic Tolling Equipment	40	Lane	$ 80,000	$ 3,200,000
7.06	Fiber Optic (2 Operational Conduits)	9	Mile	$ 300,000	$ 2,610,000
7.07	Signage	40	Lane	$ 20,000	$ 800,000
SUBTOTAL ITS					**$ 8,550,000**
CONTINGENCY (20%)					**$ 1,710,000**
SUBTOTAL ITS COST					**$ 10,260,000**
ESCALATED TOTAL ITS COST TO MID-POINT OF CONSTRUCTION					**$ 12,982,173**

8.0 R.O.W. & UTILITIES

8.01	Land and Displacement(Acquisitions, relocations, demolition, fees)				$ 437,836,650
8.02 A	Relocate Small Utility Lines (<8")	32,401	LF	$ 90	$ 2,916,090
8.02 B	Relocate Medium Utility Lines (10"-21")	27,451	LF	$ 200	$ 5,490,200
8.02 C	Relocate Large Utility Lines (24"-42")	13,725	LF	$ 390	$ 5,352,750
8.02 D	Relocate Small Drainage Lines (<18")	32,401	LF	$ 120	$ 3,888,120
8.02 E	Relocate Medium Drainage Lines (21"-42")	27,451	LF	$ 190	$ 5,215,690
8.02 F	Relocate Large Drainage Lines (48"-72")	14,025	LF	$ 370	$ 5,189,250
8.02 G	Relocate Fiber Optics Line	27,451	LF	$ 250	$ 6,862,750
8.02 H	Relocate Transmission Tower	5	EA	$ 400,000	$ 2,000,000
8.02 I	Adjust Transmission Tower	57	EA	$ 400,000	$ 22,800,000
8.02 J	Relocate U/G Electric Distribution Line	22,501	LF	$ 200	$ 4,500,200
8.02 K	Relocate Overhead Transmission Line	20,000	LF	$ 210	$ 4,200,000
8.02 L	Relocate Electric Substation	1	EA	$ 350,000	$ 350,000
8.02 M	Utility Contingencies (20%)	1	LS	$13,753,010.0	$ 13,753,010
SUBTOTAL R.O.W. & UTILITIES					**$ 520,354,710**

Less $8,000,000 (20 Oncor towers at $400,000 each)

-$8,000,000 = $512,354,710

9.0 SOFT COST

Subtotal Construction Cost		**$ 1,066,007,469**
9.01	**Administrative**	
	GEC / PMO (2.25%)	**$ 23,985,168**

Level "E" Estimate 1/4/2012

Cost Exhibit 3

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
	Corridor Management (2.5%)				$ 26,650,187
	Legal Consulting Fees (0.5%)				$ 5,330,037
9.02	**Planning**				
	Feasibility Studies & Advanced Planning (0.75%)				$ 7,995,056
	Cost of Finance (0.75%)				$ 7,995,056
	EIS/EA Schematic (0.5%)				$ 5,330,037
9.03	**Design**				
	PS&E (6.5%) (DSE, geotechnical, pavement, landscaping, MSE wall design)				$ 69,290,485
	Surveying (0.25%)				$ 2,665,019
9.04	**R.O.W. Acquisition Consultant (1.5%) (RAT Team, asbestos insp. & abatement)**				$ 15,990,112
9.05	**Construction Support**				
	Construction Management (6.75%)				$ 71,955,504
	Materials Testing & Environmental Compliance (1.25%)				$ 13,325,093
	Wall Engineer (0.25%)				$ 2,665,019
	Independent Assurance (0.75%)				$ 7,995,056
9.06	**Reimbursements (1%)**				$ 10,660,075
9.07	**Special Services Consultant**				$ -
9.08	**Unique Features (historic sites, wetlands) - Optional**				$ -
Subtotal Soft Cost					$ 271,831,905
ESCALATED TOTAL SOFT COST TO MID-POINT OF CONSTRUCTION					$ 343,954,079

TOTAL PROJECT COST SUMMARY (CURRENT DOLLARS)

Total Construction Cost		$ 1,066,007,469
Total ITS Cost		$ 10,260,000
Total R.O.W. & Utilities		$ 520,354,710
Total Soft Cost		$ 271,831,905
TOTAL PROJECT COST (CURRENT DOLLARS)		$ 1,868,454,084
	SAY	$ 1,868,455,000

TOTAL PROJECT COST SUMMARY (ESCALATED)

Escalated Total Construction Cost		$ 1,348,839,524
Escalated Total ITS		$ 12,982,173
Total R.O.W. & Utilities		$ 520,354,710
Escalated Total Soft Cost		$ 343,954,079
TOTAL PROJECT COST (ESCALATED)		$ 2,226,130,487
	SAY	$ 2,226,131,000

REPORTING COST DISTRIBUTION

Professional Services		$ 70,814,075
Planning		$ 26,976,790
Design		$ 91,046,668
Other		$ 13,488,395
Gantries		$ 10,578,067
ITS		$ 12,982,173
Right-of-Way and Utilities		$ 540,587,303
Construction Management		$ 121,395,557
Construction/Installation		$ 1,097,726,953
Construction Contingency		$ 224,806,587
Maintenance Facilities		$ 15,727,915
TOTAL PROJECT COST		$ 2,226,130,485
	SAY	$ 2,226,131,000

Notes:

1) The unit costs to construct this facility are based on the unit prices of recently constructed similar facilities and/or the latest average unit prices of TxDOT projects.
2) Preliminary horizontal and vertical alignments are developed. Approximate quantities of major roadway and structure elements can be calculated.
3) Proposed drainage and utilities elements are not developed and quantities are not calculated individually yet.
4) Major above surface utility relocations could be identified (i.e. electric transmission lines, telephone poles, etc).
5) Approximate right-of-way needs can be estimated.
6) Approximate ITS elements needs can be identified.
7) Unit costs of similar projects are used to calculate construction cost.
8) Contingencies are applied to construction and ITS cost.
9) The proposed Jefferson Street Bridge replacement is a TxDOT project and therefore not included in this cost estimate.

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Cost Exhibit 4

TOTAL PROJECT COST
TRINITY PARKWAY - ALT 3C
IH 35E TO US 175 (9.9 MILES) / SIX GP LANES (ULTIMATE SECTION)

PRELIMINARY/CONCEPTUAL ESTIMATE OF PROBABLE COSTS OF CONSTRUCTION

LEVEL "E" SCHEMATIC PHASE ESTIMATE

Version ________

Created By:	JWM
Date:	3/1/2011
Checked by:	MGC
Date:	1/4/2012
Official Estimate Date:	3/1/2011
Mid-point of Anticipated Construction:	7/1/2017
Anticipated Construction Duration:	

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
1.0 ROADWAY					
1.01 A	Mainlane Pavement	355,693	SY	$ 70	$ 24,898,510
1.01 B	Asphalt Shoulders	188,545	SY	$ 50	$ 9,427,250
1.02	Frontage Road Pavement	50,093	SY	$ 70	$ 3,506,510
1.03	Ramp Pavement	58,477	SY	$ 70	$ 4,093,390
1.04	Cross Street Pavement	51,027	SY	$ 70	$ 3,571,890
1.05	Monolithic Curb	46,420	LF	$ 2	$ 92,840
1.06	Pavement Striping (Solid)	431,453	LF	$ 2	$ 862,906
1.07	Pavement Striping (Broken)	87,691	LF	$ 2	$ 175,382
1.08	Concrete Traffic Barrier	190,740	LF	$ 50	$ 9,537,000
1.09	Excavation	28,740	CY	$ 5	$ 143,700
1.10	Embankment	8,599,896	CY	$ 10	$ 85,998,960
1.11	Embankment (Borrow)	324,000	CY	$ 15	$ 4,860,000
SUBTOTAL ROADWAY					**$ 147,168,338**
2.0 STRUCTURES					
2.01	Main Lane Bridge (Standard)	2,890,278	SF	$ 60	$ 173,416,680
2.02	Main Lane Bridge (Special)	662,810	SF	$ 95	$ 62,966,950
2.03	Frontage Road Bridge (Standard)	0	SF	$ 60	$ -
2.04	Frontage Road Bridge (Special)	0	SF	$ 95	$ -
2.05	Ramp Bridge (Standard)	981,700	SF	$ 60	$ 58,902,000
2.06	Ramp Bridge (Special)	625,836	SF	$ 95	$ 59,454,420
2.07	Cross Street Bridge	2,080	SF	$ 60	$ 124,800
2.08	Retaining Wall (Cut)	0	SF	$ 42	$ -
2.09	Retaining Wall (Fill)	227,700	SF	$ 35	$ 7,969,500
2.10	Flood Wall	97,700	SF	$ 50	$ 4,885,000
2.11	Park Access Bridge	121,600	SF	$ 56	$ 6,809,600
2.12	Pedestrian Access Bridge	90,090	SF	$ 54	$ 4,864,860
2.13	Reunion Pedestrian Platform	1	EA	$ 7,748,810	$ 7,748,810
2.14	Bridge Widening (Standard)	270,180	SF	$ 90	$ 24,316,200
2.15	Bridge Widening (Special)	27,090	SF	$ 130	$ 3,521,700
2.16	Slurry Wall	30,000	LF	$ 1,000	$ 30,000,000
SUBTOTAL STRUCTURES					**$ 444,980,520**
3.0 DRAINAGE					
3.01	Drainage	633	STA	$ 25,000	$ 15,825,000
3.02	Storm Drainage Lift Station	6	EA	$ 263,000	$ 1,578,000
3.03	Large Drainage Structures	0	EA	$ -	$ -
3.04	Extend Pump Station/Sewer Outfall	4	EA	$ 817,500	$ 3,270,000
SUBTOTAL DRAINAGE					**$ 20,673,000**
4.0 MISCELLANEOUS					
4.01 A	Demolition - Bridge Structure (0'-99')	0	EA	$ 15,000	$ -
4.01 B	Demolition - Bridge Structure (100'-499')	7	EA	$ 40,000	$ 280,000
4.01 C	Demolition - Bridge Structure (500'-999')	7	EA	$ 100,000	$ 700,000
4.01 D	Demolition - Bridge Structure (>999')	0	EA	$ 200,000	$ -
4.02	Demolition - Pavement	163,000	SY	$ 5	$ 815,000
4.03	Sodding including Top Soil	102,090	SY	$ 3	$ 306,270
4.04	Intersection Signalization	23	EA	$ 150,000	$ 3,450,000
4.05	Signage	633	STA	$ 20,000	$ 12,660,000
4.06	Lighting	633	STA	$ 10,000	$ 6,330,000

Cost Exhibit 4

ALTERNATIVE 3C (2011)

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
4.07	Landscape	7	MI.	$ 1,000,000	$ 7,300,000
4.08	SWP3	633	STA	$ 10,000	$ 6,330,000
4.09	R.O.W. Fence	91,700	LF	$ 15	$ 1,375,500
4.10	Environmental Mitigation	1	LS	$ 16,301,100	$ 16,301,100
4.11	Mow Strip	91,700	LF	$ 25	$ 2,292,500
4.12	Concrete Sidewalk	25,789	SY	$ 35	$ 902,615
4.13	R.O.W. Prep	633	STA	$ 10,000	$ 6,330,000
4.14	Traffic Control (Urban)	219	STA	$ 200,000	$ 43,800,000
4.15	Traffic Control (Floodway)	414	STA	$ 5,000	$ 2,070,000
4.16	Wick Drains	200	AC	$ 100,000	$ 20,000,000
SUBTOTAL MISCELLANEOUS					**$ 131,242,985**

Less
$2,451,500
for ecological
mitigation

5.0 GANTRIES

5.01	ETC Mainlane Gantry	4	Each	$ 1,000,000	$ 4,000,000
5.02	ETC Ramp Gantry	12	Each	$ 300,000	$ 3,600,000
SUBTOTAL Gantries					**$ 7,600,000**

6.0 MAINTENANCE FACILITIES

***	Maintenance Facilities	1	EA	$ 10,000,000	$ 10,000,000
***	Sand Stockpile	1	EA	$ 1,200,000	$ 1,200,000
***	Asset Data Management	1	EA	$ 100,000	$ 100,000
SUBTOTAL MAINTENANCE FACILITIES					**$ 11,300,000**

CONSTRUCTION COST SUMMARY

SUBTOTAL CONSTRUCTION	**$ 762,964,843**
Mobilization (10%)	**$ 76,296,485**
Subtotal Construction	**$ 839,261,328**
Construction Contingency (20%)	**$ 167,852,266**
TOTAL CONSTRUCTION COST (CURRENT DOLLARS)	**$ 1,007,113,594**
ESCALATED TOTAL CONSTRUCTION COST TO MID-POINT OF CONSTRUCTION (ENR CCI PROJECTION)	**$ 1,274,319,984**

1.10 x 1.20 = 1.32

7.0 ITS

7.01	CCTV	20	Each	$ 30,000	$ 600,000
7.02	Dynamic Messaging Sign	4	Each	$ 250,000	$ 1,000,000
7.03	Pavement Sensors	2	Each	$ 20,000	$ 40,000
7.04	AVI Travel Time Sensors	20	Each	$ 15,000	$ 300,000
7.05	Electronic Tolling Equipment	40	Lane	$ 80,000	$ 3,200,000
7.06	Fiber Optic (2 Operational Conduits)	9	Mile	$ 300,000	$ 2,610,000
7.07	Signage	40	Lane	$ 20,000	$ 800,000
SUBTOTAL ITS					**$ 8,550,000**
CONTINGENCY (20%)					**$ 1,710,000**
SUBTOTAL ITS COST					**$ 10,260,000**
ESCALATED TOTAL ITS COST TO MID-POINT OF CONSTRUCTION					**$ 12,982,173**

Total:
$1,017,373,594
(-$2,451,500 x 1.32)
$1,014,137,614

8.0 R.O.W. & UTILITIES

8.01	Land and Displacement(Acquisitions, relocations, demolition, fees)				$ 103,479,526
8.02 A	Relocate Small Utility Lines (<8")	30,600	LF	$ 90	$ 2,754,000
8.02 B	Relocate Medium Utility Lines (10"-21")	13,250	LF	$ 200	$ 2,650,000
8.02 C	Relocate Large Utility Lines (24"-42")	9,475	LF	$ 390	$ 3,695,250
8.02 D	Relocate Small Drainage Lines (<18")	6,550	LF	$ 120	$ 786,000
8.02 E	Relocate Medium Drainage Lines (21"-42")	4,575	LF	$ 190	$ 869,250
8.02 F	Relocate Large Drainage Lines (48"-72")	2,475	LF	$ 370	$ 915,750
8.02 G	Relocate Fiber Optics Line	4,950	LF	$ 250	$ 1,237,500
8.02 H	Relocate Transmission Tower	11	EA	$ 400,000	$ 4,400,000
8.02 I	Adjust Transmission Tower	12	EA	$ 400,000	$ 4,800,000
8.02 J	Relocate U/G Electric Distribution Line	4,000	LF	$ 200	$ 800,000
8.02 K	Relocate Overhead Transmission Line	44,000	LF	$ 210	$ 9,240,000
8.02 L	Relocate Electric Substation	0	EA	$ 350,000	$ -
8.02 M	Utility Contingencies (20%)	1	LS	$ 6,429,550.0	$ 6,429,550
SUBTOTAL R.O.W. & UTILITIES					**$ 142,056,826**

9.0 SOFT COST

Subtotal Construction Cost		**$ 1,007,113,594**
9.01	**Administrative**	

Level "E" Estimate　　1/4/2012

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
	GEC / PMO (2.25%)				$ 22,660,056
	Corridor Management (2.5%)				$ 25,177,840
	Legal Consulting Fees (0.5%)				$ 5,035,568
9.02	**Planning**				
	Feasibility Studies & Advanced Planning (0.75%)				$ 7,553,352
	Cost of Finance (0.75%)				$ 7,553,352
	EIS/EA Schematic (0.5%)				$ 5,035,568
9.03	**Design**				
	PS&E (6.5%) (DSE, geotechnical, pavement, landscaping, MSE wall design)				$ 65,462,384
	Surveying (0.25%)				$ 2,517,784
9.04	**R.O.W. Acquisition Consultant (1.5%) (RAT Team, asbestos insp. & abatement)**				$ 15,106,704
9.05	**Construction Support**				
	Construction Management (6.75%)				$ 67,980,168
	Materials Testing & Environmental Compliance (1.25%)				$ 12,588,920
	Wall Engineer (0.25%)				$ 2,517,784
	Independent Assurance (0.75%)				$ 7,553,352
9.06	**Reimbursements (1%)**				$ 10,071,136
9.07	**Special Services Consultant**				$ -
9.08	**Unique Features (historic sites, wetlands) - Optional**				$ -
Subtotal Soft Cost					$ 256,813,967
ESCALATED TOTAL SOFT COST TO MID-POINT OF CONSTRUCTION					$ 324,951,597

TOTAL PROJECT COST SUMMARY (CURRENT DOLLARS)

Total Construction Cost		$ 1,007,113,594
Total ITS Cost		$ 10,260,000
Total R.O.W. & Utilities		$ 142,056,826
Total Soft Cost		$ 256,813,967
TOTAL PROJECT COST (CURRENT DOLLARS)		$ 1,416,244,387
	SAY	$ 1,416,245,000

TOTAL PROJECT COST SUMMARY (ESCALATED)

Escalated Total Construction Cost		$ 1,274,319,984
Escalated Total ITS		$ 12,982,173
Total R.O.W. & Utilities		$ 142,056,826
Escalated Total Soft Cost		$ 324,951,597
TOTAL PROJECT COST (ESCALATED)		$ 1,754,310,580
	SAY	$ 1,754,311,000

REPORTING COST DISTRIBUTION

Professional Services		$ 66,901,799
Planning		$ 25,486,400
Design		$ 86,016,599
Other		$ 12,743,200
Gantries		$ 10,578,067
ITS		$ 12,982,173
Right-of-Way and Utilities		$ 161,171,626
Construction Management		$ 114,688,799
Construction/Installation		$ 1,035,627,337
Construction Contingency		$ 212,386,664
Maintenance Facilities		$ 15,727,915
TOTAL PROJECT COST		$ 1,754,310,578
	SAY	$ 1,754,311,000

Notes:

1) The unit costs to construct this facility are based on the unit prices of recently constructed similar facilities and/or the latest average unit prices of TxDOT projects.

2) Preliminary horizontal and vertical alignments are developed. Approximate quantities of major roadway and structure elements can be calculated.

3) Proposed drainage and utilities elements are not developed and quantities are not calculated individually yet.

4) Major above surface utility relocations could be identified (i.e. electric transmission lines, telephone poles, etc).

5) Approximate right-of-way needs can be estimated.

6) Approximate ITS elements needs can be identified.

7) Unit costs of similar projects are used to calculate construction cost.

8) Contingencies are applied to construction and ITS cost.

9) The proposed Jefferson Street Bridge replacement is a TxDOT project and therefore not included in this cost estimate.

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DALLAS NORTH TOLLWAY SYSTEM
PRESIDENT GEORGE BUSH TURNPIKE
SEGMENTS I-V

DECEMBER 2006 PROGRESS REPORT

The Trust Agreement dated July 1, 1989, as supplemented, provides that the Consulting Engineers prepare a progress report at least once every six months during the design and construction of the Project.

The President George Bush Turnpike (Turnpike) is approximately 30.5 miles long and extends from North Belt Line Road in the City of Irving to State Highway 78 (SH 78), in the City of Garland. The Turnpike is divided into five segments, as shown on Page 4, in Figure 1, and then into subsegments to enhance construction efficiencies where appropriate. For purposes of expediting design and plan development, the segments were further divided into sections with individual firms awarded contracts for design and construction of each section.

This Progress Report describes activities and progress through December 31, 2006 for Segments I-V of the Turnpike.

GENERAL

All sections of Segments I-V are complete or substantially complete, and opened to traffic, as depicted below. The Texas Department of Transportation (TxDOT) has constructed the following projects. Opening dates for each project are given in parentheses.

- *Construction of the interchange at SH 78 and westerly to Brand Road (December 1994)*
- *Construction of the interchange at US 75 (September 1997)*
- *Construction of the interchange at Dallas North Tollway (DNT (December 1998)*
- *Construction of the drainage tunnel at the Burlington Northern Santa Fe (BNSF) Railroad in the City of Carrollton (July 2001)*

- *Construction of the interchange at IH 35E (July 2001)*
- *Construction of the interchange at IH 635 (December 2001)*

The following projects are being built or have been completed by the North Texas Tollway Authority (NTTA). Opening dates for each project are given in parentheses.

- **Segments I and II**, 15.2 miles of the President George Bush Turnpike from Midway Road to Brand Road (April 2000)
- **Segment III**, west of Segment I from IH 35E to Midway Road (July 2001)
- **Segment IV,** from IH 35E to IH 635 (September 2005)
- **Segment V**, from IH 635 to Belt Line Road (December 2001)

DESIGN AND CONSTRUCTION

All design and construction contracts in Segments I – III, and V are complete and have been released. Segment IV of the Turnpike includes Sections XXIIIA (the west portion of the IH 35E Interchange), XXIV, XXV, XXV South, Main Lane Plaza No. 9, and ramp toll collection facilities. All roadway and toll plaza contracts are substantially complete.

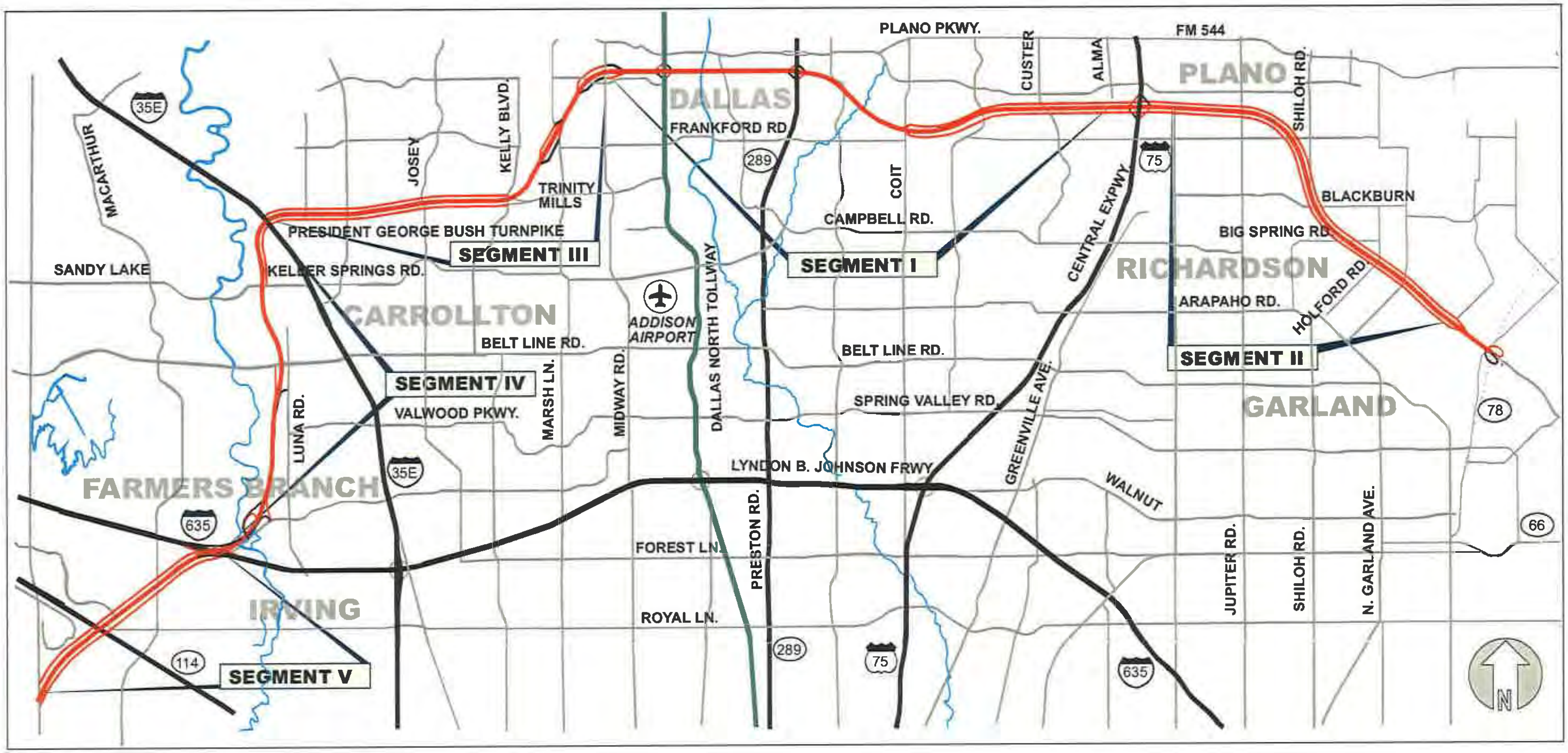
As mentioned in previous reports, the NTTA has developed an interlocal agreement with the City of Carrollton stating that, once the City has extended Valwood Parkway to the Turnpike, the NTTA will complete the construction of the full diamond interchange at Valwood Parkway. Funds for this construction have been accounted for, even though the actual construction may be deferred to such time as the City of Carrollton completes the extension of Valwood Parkway.

Table 1A, Pages 5 and 6, summarizes in detail the design and construction status of Segments I through IV. Table 1B, page 7, summarizes the status of Segment V. In addition to design firms identified above, the following contracts have been awarded for engineering services related to the Project:

DALLAS NORTH TOLLWAY SYSTEM

PRESIDENT GEORGE BUSH TURNPIKE, SEGMENTS I-V

FIGURE 1 - LOCATION MAP



ESTIMATE OF PROJECT FUNDS

The estimate of funds required for construction of the Turnpike, Segments I through V remains the same at $840,445,240. The sum of project costs for Segments I through IV of the Turnpike, exclusive of interest and financing, but including a contingency allocation also remains the same at **$756,248,315**. Table 2A on Page 11 shows the current estimated cost for each segment and estimated total project cost.

Table 2A also shows the June 2006 estimate for Segments I-IV for comparative purposes. The original estimate of cost for Segments I-IV as given in the Engineering Report and Addendum dated March 1996 is given in Table 3, Page 14. The August 1997 and June 1999 estimate of cost for Segments I-IV are given, for reference, in Table 4, Page 15, and Table 5, Page 16, respectively. In addition, the December 2000 estimate of cost for Segments I-IV is given in Table 5B, Page 17.

The current estimate of total project funds required for construction of Segment V of the Turnpike, exclusive of interest and financing, is $84,196,925 as shown in Table 2B, Page 12. Segment V is closed to further expenditure, and project costs remain under the originally estimated project cost of $86,028,300. The original estimate of project costs for Segment V, as given in the Engineering Report dated August 1998, is also shown in Table 2B for comparison purposes. Table 2C, as shown on Page 13, summarizes the current estimate of total project funds of all five segments (I through V), of the President George Bush Turnpike.

The estimates of costs for Segments I-V, as shown in Tables 2A and 2B, were developed based on the status of contracts awarded to date and is the best information available at the present time. The development of the current cost estimate represents the best good-faith judgment as a design professional familiar with the highway construction industry. It is recognized that neither the NTTA nor the Consulting Engineers have control over the cost of labor, materials or equipment; the contractors' methods of determining bid prices; or the competitive bidding, market, or negotiating conditions. Therefore, neither the NTTA nor its Consulting Engineers warrant that the Turnpike construction costs will not increase and thereby exceed the estimate of construction costs given in Progress Reports. The current estimate of costs for Segments I-V is based on the

DALLAS NORTH TOLLWAY SYSTEM

PRESIDENT GEORGE BUSH TURNPIKE, SEGMENTS I-IV

TABLE 2A - COST ESTIMATE – JUNE 2006 VS. DECEMBER 2006

No.	Item	SEGMENT I		SEGMENT II		SEGMENT III		SEGMENT IV		GRAND TOTAL	
		Engineering Est. (Jun 06)	Current Engineering Est. (Dec 06)	Engineering Est. (Jun 06)	Current Engineering Est. (Dec 06)	Engineering Est. (Jun 06)	Current Engineering Est. (Dec 06)	Engineering Est. (Jun 06)	Current Engineering Est. (Dec 06)	Engineering Est. (Jun 06)	Current Engineering Est. (Dec 06)
1	Pavement, Subgrade, Curb, etc.	29,838,960	29,838,960	16,793,310	16,793,310	32,626,260	32,626,260	28,487,000	28,569,000	107,745,530	107,827,530
2	Earthwork	16,099,940	16,099,940	8,776,490	8,776,490	28,968,270	28,968,270	22,935,000	22,983,000	76,779,700	76,827,700
3	Major Drainage Crossings	-	-	-	-	-	-	-	-	-	-
4	Drainage	9,496,610	9,496,610	6,804,720	6,804,720	15,768,810	15,768,810	3,638,000	3,638,000	35,708,140	35,708,140
5	Bridges (Full Width Structure)	19,946,870	19,946,870	10,290,810	10,290,810	18,903,420	18,903,420	95,961,000	96,122,000	145,102,100	145,263,100
6	Retaining Walls	6,262,320	6,262,320	7,785,700	7,785,700	14,791,670	14,791,670	6,264,000	6,264,000	35,103,690	35,103,690
7	Screen Walls	2,202,450	2,202,450	-	-	1,906,530	1,906,530	622,000	622,000	4,730,980	4,730,980
8	Median Separation	-	-	-	-	-	-	-	-	-	-
9	Corridor Enhancement	-	-	-	-	-	-	-	-	-	-
10	Illumination	1,019,200	1,019,200	1,039,400	1,039,400	2,307,630	2,307,630	2,149,000	2,149,000	6,515,230	6,515,230
11	Signing and Striping	2,097,060	2,097,060	2,560,180	2,560,180	3,622,820	3,622,820	3,980,000	4,055,000	12,260,060	12,335,060
12	Signalization	380	380	-	-	201,990	201,990	1,056,000	1,056,000	1,258,370	1,258,370
13	Toll Collection Equipment	3,608,250	3,608,250	3,465,090	3,465,090	6,766,080	6,766,080	8,900,000	8,900,000	22,739,420	22,739,420
14	Toll Plazas, Buildings, and Landscaping	14,955,970	14,955,970	11,555,240	11,555,240	7,189,930	7,189,930	8,400,000	8,400,000	42,101,140	42,101,140
15	Utility Relocations	2,858,840	2,858,840	2,084,090	2,084,090	6,118,310	6,118,310	3,370,000	3,370,000	14,431,240	14,431,240
16	Environmental Mitigation	-	-	-	-	-	-	16,781,000	16,781,000	16,781,000	16,781,000
17	Mobilization	3,135,920	3,135,920	2,300,000	2,300,000	4,506,660	4,506,660	19,453,000	19,453,000	29,395,580	29,395,580
TOTAL CONSTRUCTION COST		**$ 111,522,770**	**$ 111,522,770**	**$ 73,455,030**	**$ 73,455,030**	**$ 143,678,380**	**$ 143,678,380**	**$ 221,996,000**	**$ 222,362,000**	**$ 550,652,180**	**$ 551,018,180**
1	Engineering	13,873,320	13,873,320	12,299,710	12,299,710	18,449,520	18,449,520	41,751,000	41,751,000	86,373,550	86,373,550
2	Legal and Administrative	1,843,210	1,843,210	1,872,450	1,872,450	2,909,990	2,909,990	6,500,000	6,500,000	13,125,650	13,125,650
3	Contingencies	-	-	-	-	1,500,000	1,500,000	17,783,965	16,727,965	18,593,965	18,917,965
4	Testing and Boring	270,180	270,180	-	-	285,250	285,250	-	-	555,430	555,430
5	Construction Materials Testing	1,514,490	1,514,490	1,046,190	1,046,190	1,511,280	1,511,280	4,620,000	4,620,000	8,691,960	8,691,960
6	Right-of-Way	2,378,970	2,378,970	409,880	409,880	32,919,930	32,919,930	42,546,800	42,546,800	78,255,580	78,255,580
TOTAL E & C COST		**$ 19,880,170**	**$ 19,880,170**	**$ 15,628,230**	**$ 15,628,230**	**$ 57,575,970**	**$ 57,575,970**	**$ 112,511,765**	**$ 112,145,765**	**$ 205,596,135**	**$ 205,930,135**
TOTAL COST		**$ 131,402,940**	**$ 131,402,940**	**$ 89,083,260**	**$ 89,083,260**	**$ 201,254,350**	**$ 201,254,350**	**$ 334,507,765**	**$ 334,507,765**	**$ 756,248,315**	**$ 756,248,315**

Remove & combine with ROW

$222,362,000
- $3,370,000
$218,922,000

ROW + Utilities Relocation =
$ 42,546,800
+ $3,370,000
$45,916,800

NOTE:
(1) Median Separation: Concrete median barriers were installed and financed with Series 1995 bonds on Segment IV and are tracked under the Pavement, Subgrade, Curb, etc. line item. Concrete median barrier for the remainder of the project was provided for outside of the Series 1995 and 1998 bonds.
(2) Illumination: Includes safety lighting (roadway contract-installed lighting and NTTA furnished lighting items)
(3) Signalization: Includes any signalization that may be included in the roadway contracts and inter-local agreements.
(4) Utility Relocations: Includes utility relocations in the roadway contracts and individual contracts with other utility companies.

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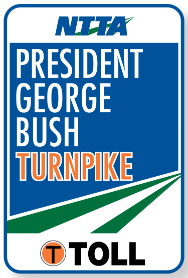
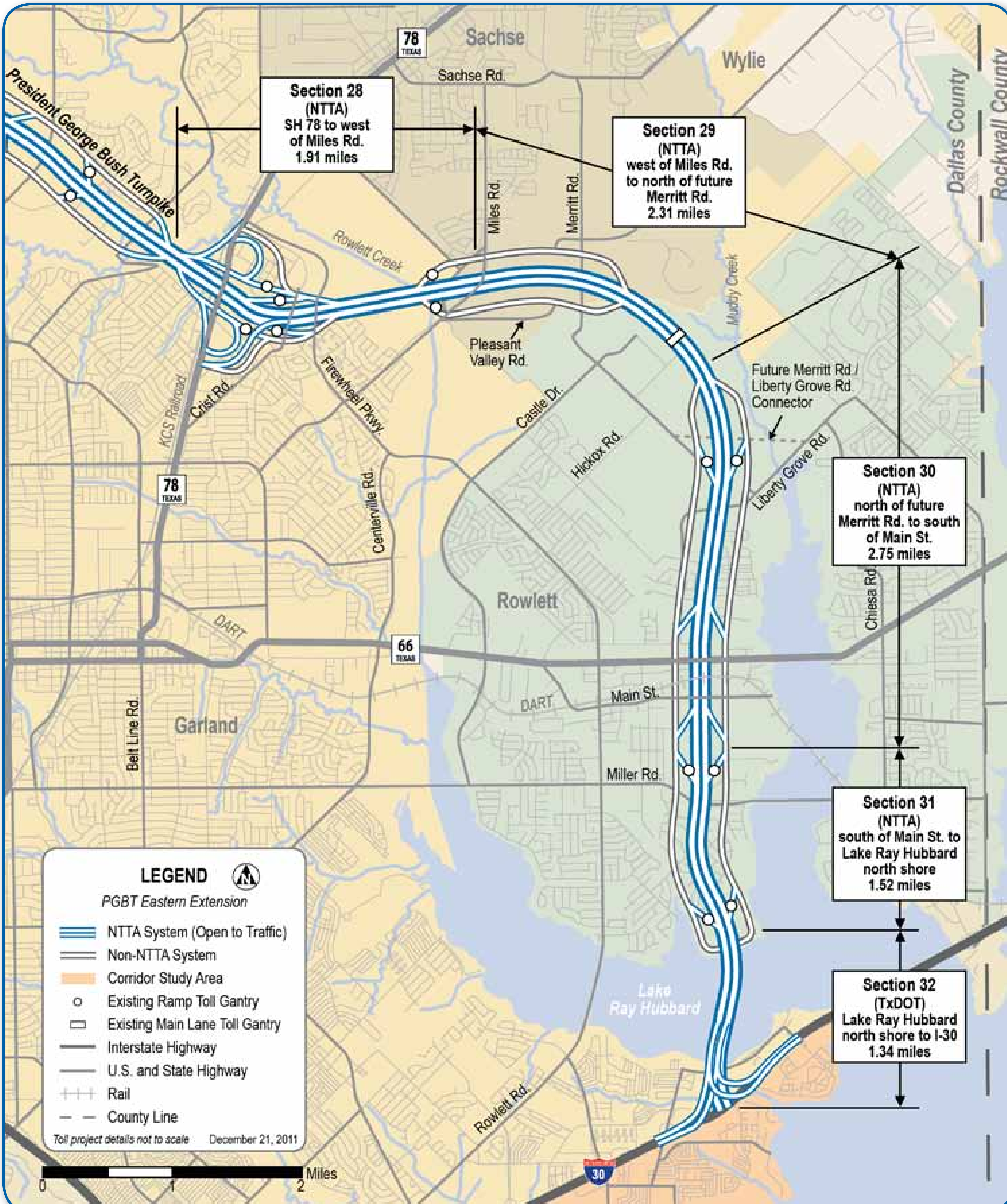
GENERAL INTRODUCTION



The President George Bush Turnpike *(PGBT)* Eastern Extension Project *(the "Project", "PGBT EE")* is located entirely in Dallas County, beginning from the existing terminus of PGBT at State Highway (SH) 78 in Garland, extending east through the City of Sachse, turning south through the cities of Rowlett and Dallas, and terminating at Interstate Highway (I) 30 in Garland, a distance of approximately 9.9 miles.

Prior to the start of this project in late 2005, the NTTA completed construction and opened to traffic the frontage roads from SH 78 to Firewheel Parkway in Garland in conjunction with the opening of Firewheel Mall. The advanced frontage road project is adjacent to the northwest portion of the Project in Section 28. The six-lane project *(expandable to eight)* is divided into five sections for the purposes of managing and expediting design and construction *(refer to Figure 3 on page 23)*. Sections 28-31 were designed and constructed by the NTTA, while Section 32 was designed and constructed by TxDOT. A total of 12 ramp connections to or from the Project have an overhead gantry allowing placement of all electronic toll collection *(all-ETC)* equipment. One main lane All-ETC gantry, located northwest of future Merritt Road in Section 29, provides six toll collection lanes *(three each direction with provision for expansion to eight total lanes)*. All lanes are dedicated non-stop express lanes to expedite the flow of traffic through the gantries, improve traffic safety and air quality, and provide for ease of maintenance.

Figure 3: President George Bush Turnpike Eastern Extension Corridor Map



DESIGN AND CONSTRUCTION STATUS

Design and construction status information has been summarized by section in Tables 9 and 10 on pages 25 and 26. Additional service providers key to the project are shown in Table 11 on page 26.

ESTIMATE OF PROJECT COSTS

The original estimated cost of the Project *(Sections 28-32)* was \$1,037,150,116, plus \$2,601,438 for ITS equipment, for a total of \$1,039,751,554. In the fall of 2010, the General Engineering Consultant *(GEC)* re-evaluated the project cost based upon bids received as well as construction and construction change orders to date. The Project total at completion was estimated at \$958 million at that time. Again, in February 2011, the GEC re-evaluated the project resulting in a new estimate at completion cost for the Project of \$834,500,000.

TxDOT committed to fund the design and construction of Section 32 *(originally estimated at approximately \$254M, currently estimated to be approximately \$205.5M)*. In addition to constructing Section 32 of the Project, TxDOT provided a Toll Equity Grant (approximately \$160M) to be used primarily for right of way acquisition and utility relocations. Based on the current outlook of the Project, the entire Toll Equity Grant will not be required for right of way, utility relocation and similar costs. Within the agreement authorizing the Toll Equity Grant, TxDOT and the NTTA agreed to allow the unused portion of the grant to be applied to other Project costs so that the entire amount of that grant would be applied to the Project. In turn, the NTTA agreed to revenue-sharing with TxDOT on the Project, subject to the terms agreed to in the Second Amendment to the Project Agreement dated Dec. 21, 2011.

Several factors, including unforeseen escalation of prices and wages, labor or material shortages and changes in economic conditions can significantly affect *(escalate or reduce)* construction costs. Appropriate contingencies are added to the cost of the Project to mitigate the impact of unforeseen escalations. The estimated Project cost reflects the most current bids, approved change orders and our professional judgment of the construction industry; it is our belief that the Project can be constructed within the limits described for the estimated cost given herein. However, the nature of the construction industry precludes the provision of a guarantee that the actual Project cost will not vary from the estimated cost.

The current cost estimate represents the best good-faith judgment from design professionals familiar with the highway construction industry. Neither the NTTA nor its consulting engineers have control over the labor, materials or equipment costs, the contractors' methods of determining bid prices, competitive bidding, market or negotiating conditions. The estimate of construction costs given in progress reports will be monitored as work progresses on the Project. The draw schedule of expected costs are shown in semi-annual increments for the estimated period of construction to meet the cost of the PGBT Eastern Extension Project, including funds allocated for project contingencies, is shown in Table 13 on page 28.

TABLE 12 – ESTIMATE OF PROJECT COSTS AT COMPLETION				
No.	Description	Proposed Engineering Report Estimate, August 2008	Estimated Cost, December 2012	Actual Expenditures, December 2012
1	Section 28	$124,785,106	$116,320,849	$115,307,308
2	Section 29	$86,658,563	$59,232,238	$58,982,238
3	Section 30	$160,936,511	$127,948,568	$127,671,995
4	Section 31	$65,980,548	$57,782,212	$57,658,066
5	Toll and ITS Equipment [1]	$9,817,500	$3,949,191	$3,824,818
6	Construction Management	$31,371,535	$23,489,440	$22,609,632
7	Miscellaneous Construction [2]	$8,235,919	$13,400,946	$8,332,929
Subtotal (1-7) Construction		**$487,785,682**	**$402,123,444**	**$394,386,986**
8	PS&E (Plans, Specs, Estimates) & Admin.	$30,367,525	$52,212,267	$51,523,628
9	ROW Acquisition and Utility Relocations	$166,844,730	$125,081,237	$124,259,661
10	Other Agency Costs	$11,095,916	$3,403,334	$2,754,778
Subtotal (8-10) Engineering		**$208,308,171**	**$180,696,838**	**$178,538,067**
11	Project Contingency	$92,643,362	$46,196,819	$ -
Project Subtotal (1-11) [3]		**$788,737,215**	**$629,017,100**	**$572,925,052**
12	Section 32 [4]	$251,014,339	$205,482,900	
Project Total (1-12) [5]		**$1,039,751,554**	**$834,500,000**	

Total Construction
$607,606,344

NOTES:

[1] The cost of toll gantry and ITS infrastructure construction is included within the construction cost of each section.

[2] Miscellaneous construction cost includes landscaping, materials testing and other special features.

[3] A toll Equity Grant in the amount of $160 million has been supplied by TxDOT to be used primarily for ROW acquisitions, utility relocations or any other costs for the Project agreed to mutually between the NTTA and TxDOT. The City of Rowlett reimbursed the NTTA for $788,000 of requested design and construction accommodations. In addition to these enhancements, the City of Rowlett requested utility betterments in the amount of $3,376,851, which are to be reimbursed to the NTTA.

[4] Under the two-party agreement, TxDOT is responsible for the design, construction and construction management of Section 32.

[5] The amount shown above does not include bond discounts, interest during and after construction, and other costs associated with bond closing costs. City of Rowlett has provided $788,000 for requested design and construction accommodations.

President George Bush Turnpike, Western Extension, 4th Progress Update

General Introduction

The President George Bush Turnpike Western Extension (PGBT WE) extended the existing State Highway 161 (SH 161) approximately 11.5 miles south from State Highway 183 (SH 183) interchange, crossing Interstate Highway 30 (I-30), and terminating at Interstate Highway 20 (I-20). PGBT WE extends the loop around the City of Dallas and its suburbs. The project is a joint effort between the Authority, the Texas Department of Transportation (TxDOT) and the Regional Transportation Council (RTC) of the North Central Texas Council of Governments (NCTCOG).

The typical section along the PGBT WE generally consists of three-lane frontage roads in each direction, six or eight main lanes (two or three lanes in each direction), and one- or two-lane slip ramps. The main lane construction from I-20 to I-30 consists of four main lanes (two lanes in each direction). The main lane configuration from I-30 to SH 183 consists of six main lanes (three lanes in each direction).

PGBT WE was divided into four phases for purposes of managing and expediting the design and construction (refer to Figure 1 on page 5). TxDOT was responsible for the design and construction contracts for Phases 1, 2 and 3, except the toll gantries and toll collection equipment. The Authority was responsible for design and construction of all toll gantries and toll collection equipment for Phases 2 and 3. Responsible for design and construction of Phase 4, the Authority used a design-build procurement. The Authority is also responsible for the landscaping for all phases of the project.

The current total estimated cost for all Authority deliverables for PGBT WE, exclusive of payment, but including a contingency allocation, is $546,598,381. Table 3 on page 9 shows all expenditures through February 2013. The remaining estimated funds required are presented in semi-annual increments, including funds allocated for project contingencies, in Table 4 (located on Page 11). For purposes of preparing this report, the cutoff date for all financial information was February 28, 2013, while information in the narrative may include details as current as the report release date, April 12, 2013.

I-30/PGBT Western Extension interchange

Project Corridor Location and Phases Map

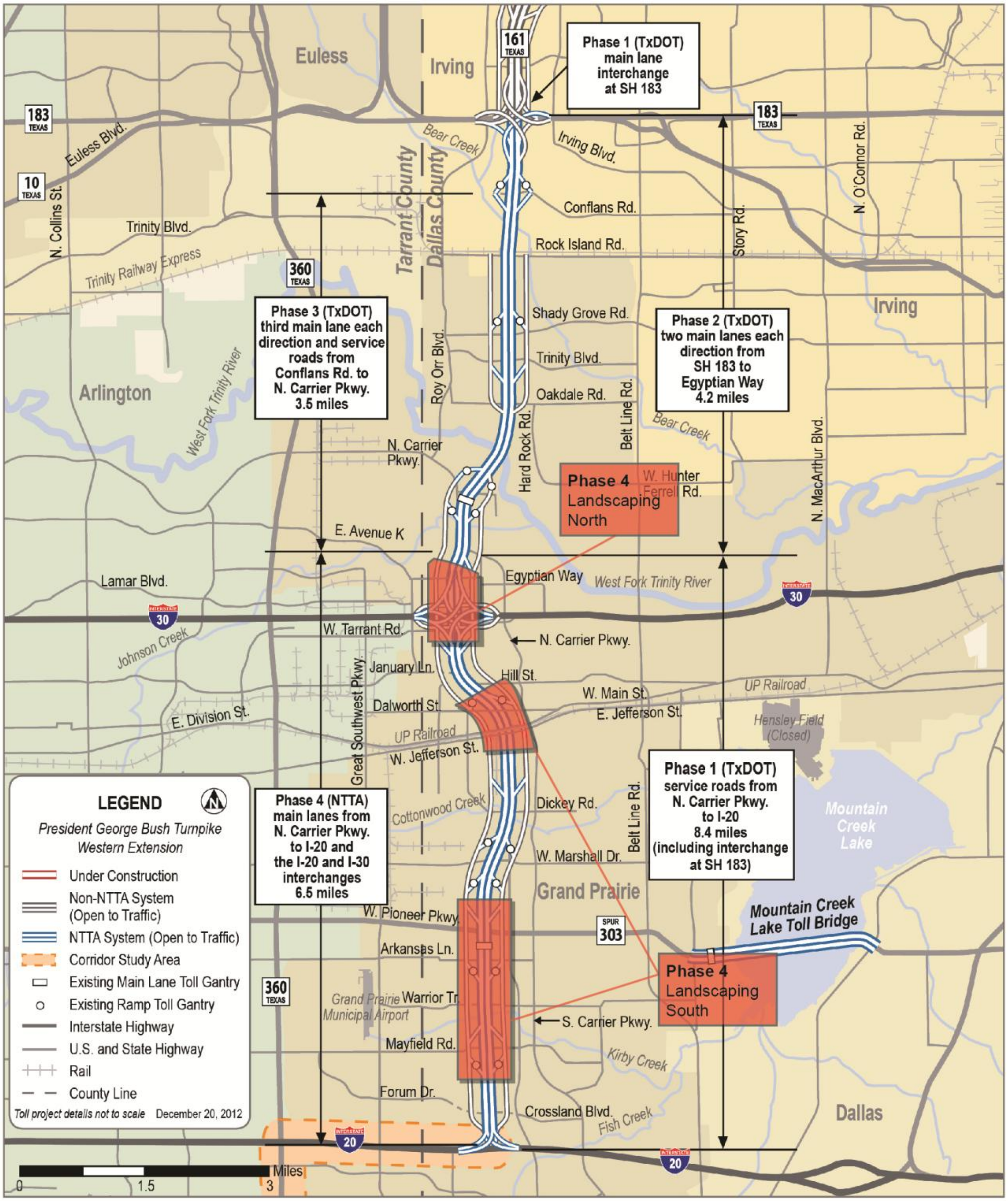


Figure 1: PGBT Western Extension Project Corridor Location and Phases.

Estimate of Project Funds

Table 3 shows a summary of the engineer's estimate as of April 21, 2011 as well as the current estimated cost at completion. The total project cost includes engineering, legal and administrative, materials testing, and utility relocation costs that are the Authority's responsibility. The current estimate at completion cost for Phase 4 remains unchanged from the engineer's estimate at $546,598,381. This estimate also includes the electronic toll collection/ intelligent transportation systems (ETC/ITS) equipment in Phases 2 and 3, not including any future expansion lane widening or interest earned before or after construction.

Several factors, including unforeseen escalation of prices and wages, labor or material shortages, or changes in economic conditions, can significantly affect (escalate or reduce) construction costs. Appropriate contingencies are added to the cost of the project to mitigate the impact of unforeseen escalations. The estimated project cost reflects the most current bids, approved change orders, and Atkins' professional judgment of the construction industry, and it is our belief that PGBT WE can be constructed within the limits described for the estimated cost given herein. However, due to the nature of the construction industry, Atkins cannot guarantee that the actual project cost will not vary from the estimated cost.

The current cost estimate represents the best good-faith judgment from design professionals familiar with the highway construction industry. Neither the Authority nor its consulting engineers have control over the labor, material or equipment costs, contractors' methods of determining bid prices, competitive bidding, and market or negotiating conditions. The estimate of construction costs given in this progress report will be monitored as work progresses.

Estimate of Project Costs at Completion

Table 3: Estimate of Project Costs at Completion.

No.	Description	Engineer's Estimate, April 2011	Estimate at Completion Cost, as of February 2013	Actual Expenditures, as of February 2013
1	Administration (incl. Corridor Management, Legal)	$ 22,100,000	$ 20,876,103	$ 19,935,051
2	Planning	$ 8,500,000	$ 7,603,206	$ 6,208,736
3	Design	$ 5,000,000	$ 4,237,746	$ 3,468,650
4	Construction, Construction Management, Miscellaneous Construction[1]	$ 461,904,130	$ 461,512,898	$ 440,194,645
5	ITS and Toll Gantry Equipment	$ 12,146,440	$ 7,144,732[2]	$ 5,212,860
6	Right-of-way (ROW), Utilities	$ 1,989,145	$ 1,752,525	$ 1,752,525
7	Project Contingencies	$ 34,958,666	$ 43,471,171	$ -
Original Project Total (1-7)[3, 4, 5]		**$ 546,598,381**	**$ 546,598,381**	**$ 476,772,467**

Total Construction $468,657,630

ROW & Utilities

NOTES:

[1] The cost of toll gantry and ITS infrastructure construction is included within the construction cost of each phase.

[2] The amount shown includes the potential risk identified in February 2013 forecasts.

[3] Under the Project Agreement, TxDOT was responsible for the design, construction, and construction management of Phases 1, 2 and 3, except for toll gantries and lane equipment.

[4] The amount shown above does not include bond discounts, interest during and after construction, and other financing costs.

[5] An Advance Funding Agreement with TxDOT provided for a reimbursement to the Authority not to exceed $12 million for construction related to the UPRR bridge over the main lanes, the frontage road at-grade highway-railroad crossings, the frontage road intersections with Main and Jefferson Streets, and landscaping.

Source: NTTA Project Delivery

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Texas Department of Transportation

Item	Preliminary Alternative Border Highway West	Preliminary Alternative Coles-Paisano Interchange	
CONSTRUCTION COST			
Roadway (non-structure) Cost	26,500,000	3,500,000	
Structure Cost	273,500,000	13,400,000	
Utility Relocation Cost	23,200,000 +	1,100,000	= $ 24,300,000 Utilities
Drainage Cost	27,100,000	1,300,000	
Miscellaneous Costs	116,500,000	8,800,000	
SUBTOTAL Construction Cost	480,000,000 +	28,700,000	= $508,700,000
Const. Cost per Mile ($/mi.)	67,300,000	25,400,000	- $ 24,300,000
ENGINEERING AND TECHNICAL COSTS			$484,400,000 Total Construction
Engineering Services (PS&E) Cost (6%)	28,800,000	1,800,000	
Surveying Cost (1%)	4,800,000	300,000	
Geotechnical Cost (2%)	9,600,000	600,000	
Construction Management Cost (6%)	28,800,000	1,800,000	
Materials Testing Cost (2%)	9,600,000	600,000	
SUBTOTAL Engineering and Technical Cost	81,600,000	4,900,000	

ROW Cost ($)	114,700,000 +	8,800,000	= $123,500,000 ROW
Engineering & Technical Cost ($)	81,600,000	4,900,000	+ $ 24,300,000
Construction Cost ($)	480,000,000	28,700,000	$147,800,000 ROW + Utilities
Prelim. Total Cost (2012$)	677,000,000	43,000,000	
Inflation (2 years at 3.5%)	48,220,000	3,063,000	
Prelim. Total Cost (2014 $)	726,000,000	47,000,000	

Notes:

1. The limits of Border Highway West are from the US 85/Racetrack interchange to 1 mile east of Park St, including the Coles-Paisano Interchange.
2. This cost estimate is based on the designs shown in the Draft 100% Schematic, submitted on January 31, 2013.
3. Utility relocation costs are included in construction cost.
4. Engineering, surveying, geotechnical, and testing services are included in the total cost.
5. Contingencies are applied to the construction items, including utility relocation and drainage costs.
6. The ROW cost is inflated to account for possible displacement, business disruption, and relocation costs.
7. All costs are in 2012 dollars, except the cost total shown in inflated 2014 dollars.
8. **Costs are conceptual level only, and may vary significantly upon further refinement.**

Item	Preliminary Alternative: Border Highway West	Preliminary Alternative: Coles-Paisano Interchange
Centerline Length (mi.)	7.14	1.13
Length on Existing Align. (mi.)	3.24	0.84
Length in Bored Tunnel (mi.)	-	-
Length Below Grade (mi.)	0.14	-
Length At Grade (mi.)	1.37	0.00
Length On Ret. Wall (mi.)	2.61	0.59
Length On Structure (mi.)	4.75	0.61
Length Special Structure (mi.)	2.42	0.03
Length Exotic Structure (mi.)	-	-
ROW (ac.)	204.78	27.02
ROW Existing (ac.)	88.78	22.39
ROW Proposed (ac.)	116.00	4.63
Utility Relocation Cost ($)	23,200,000	1,100,000
ROW Cost ($)	114,700,000	8,800,000
Engineering & Technical Cost ($)	81,600,000	4,900,000
Construction Cost ($)	480,000,000	28,700,000
Const. Cost per Mile ($/mi.)	67,300,000	25,400,000
Prelim. Total Cost (2012$)	677,000,000	43,000,000
Inflation (2 years at 3.5%)	48,220,000	3,063,000
Prelim. Total Cost (2014 $)	726,000,000	47,000,000

Notes:

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7. All costs are in 2012 dollars, except the cost total shown in inflated 2014 dollars.
8. **Costs are conceptual level only, and may vary significantly upon further refinement.**

Cost Exhibit 8

PRELIMINARY ESTIMATE OF PROBABLE COSTS OF CONSTRUCTION
BORDER HIGHWAY WEST (LOOP 375) CORRIDOR E.I.S.
JANUARY 2013 DRAFT 100% SCHEMATIC

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
1.0 ROADWAY					
1.01	Main Lane Pavement	105136	SY	$ 50.00	$ 5,256,800
1.02	Ramp Pavement	40982	SY	$ 50.00	$ 2,049,100
1.03	Surface Street/Frontage Pavement	104163	SY	$ 50.00	$ 5,208,150
1.04	Sidewalk	15217	SY	$ 45.00	$ 684,765
1.05	Concrete Traffic Barrier	47280	LF	$ 48.00	$ 2,269,440
1.06	Curb and Gutter	9940	LF	$ 14.00	$ 139,160
1.07	Pedestrian Ramps	66	EACH	$ 1,110.00	$ 73,260
1.08	Pedestrian Rails	956	LF	$ 90.00	$ 86,040
1.09	Pavement Striping (Solid White)	194500	LF	$ 0.35	$ 68,075
1.10	Pavement Striping (Broken)	181390	LF	$ 0.40	$ 72,556
1.11	Pavement Striping (Solid Yellow)	167240	LF	$ 0.35	$ 58,534
1.12	RPM	5442	EACH	$ 2.80	$ 15,237
1.13	Embankment	97192	CY	$ 11.32	$ 1,100,213
1.14	Excavation	750022	CY	$ 9.26	$ 6,945,204
				Contingencies (10%)	$ 2,402,653
SUBTOTAL ROADWAY					**$ 26,429,187**
2.0 STRUCTURES					
2.01	Main Lane Bridge (I-Girder)	1216337	SF	$ 85.00	$ 103,388,645
2.02	Main Lane Bridge (Straddle Bent Spans)	1014999	SF	$ 85.00	$ 86,274,915
2.03	Main Lane Bridge (Long steel/segment)	37742	SF	$ 175.00	$ 6,604,850
2.04	Ramp Bridge (I-Girder)	311602	SF	$ 85.00	$ 26,486,170
2.05	Ramp Bridge (Straddle Bent Spans)	62308	SF	$ 85.00	$ 5,296,180
2.06	Ramp Bridge (Long steel/segmental)	5040	SF	$ 175.00	$ 882,000
2.07	Surface St./Frontage Rd. Bridge (Std.)	33401	SF	$ 85.00	$ 2,839,050
2.08	Railroad Crash Wall	2125	LF	$ 560.00	$ 1,190,000
2.09	Parking Deck over Detention Ponds	121642	SF	$ 65.00	$ 7,906,730
2.10	MSE Wall (Below Grade)	3672	SF	$ 60.00	$ 220,320
2.11	MSE Wall (Above Grade)	228455	SF	$ 33.00	$ 7,539,015
				Contingencies (10%)	$ 24,862,788
SUBTOTAL STRUCTURES					**$ 273,490,663**
3.0 UTILITIES AND DRAINAGE					
3.01 RCP					
3.01a	24" RCP	10807	LF	$ 67.00	$ 724,069
3.01b	30" RCP	500	LF	$ 70.00	$ 35,000
3.01c	36" RCP	1113	LF	$ 85.00	$ 94,605
3.01d	42" RCP	1240	LF	$ 95.00	$ 117,800
3.01e	48" RCP	104	LF	$ 105.00	$ 10,920
3.01f	Forcemain	115	LF	$ 250.00	$ 28,750
3.02 DRAINAGE STRUCTURES					
3.02a	Type AAD	100	EA	$ 6,000.00	$ 600,000
3.02b	Type C	15	EA	$ 5,000.00	$ 75,000
3.02c	Manholes	30	EA	$ 5,000.00	$ 150,000
3.02d	Pump Station	1	EA	$ 3,500,000.00	$ 3,500,000
3.02e	Outfall (Ponding Area)	31	EA	$ 20,000.00	$ 620,000
3.02f	Outfall (Rio Grande River)	6	EA	$ 50,000.00	$ 300,000
3.02g	7'x5' MBC	224	LF	$ 220.00	$ 49,280
3.02h	6'x4' MBC	236	LF	$ 200.00	$ 47,200
3.02i	4'x4' MBC	266	LF	$ 180.00	$ 47,880
3.02j	14'x5' Headwall	2	EA	$ 15,000.00	$ 30,000
3.02k	12'x4' Headwall	2	EA	$ 12,000.00	$ 24,000
3.02l	8'x4' Headwall	2	EA	$ 10,000.00	$ 20,000
3.02m	Earthwork for Ponds	726518	CY	$ 10.00	$ 7,265,180
3.03 BRIDGE DRAINAGE					
3.03a	Deck Drain	295	EA	$ 2,500.00	$ 737,500
3.03b	12" PVC	8272	LF	$ 50.00	$ 413,600
3.03c	15" PVC	50	LF	$ 60.00	$ 3,000
3.03d	24" PVC	200	LF	$ 70.00	$ 14,000
3.03e	12" Steel Pipe	572	LF	$ 290.00	$ 165,880
3.03f	15" Steel Pipe	324	LF	$ 310.00	$ 100,440
3.03g	18" Steel Pipe	22729	LF	$ 325.00	$ 7,386,925
	Sub-Total Conceptual Drainage Improvements Cost				$ 22,561,029
3.04 UTILITIES					

3.04a	Electric OH	14458	EA	$ 100.00	$ 1,445,800
3.04b	Electric UG	7901	LF	$ 200.00	$ 1,580,200
3.04c	Water Lines	1	LS	$ 5,370,483.00	$ 5,370,483
3.04d	Sewer Lines	1	LS	$ 7,722,565.00	$ 7,722,565
3.04e	Gas Lines	3681	LF	$ 30.00	$ 110,430
3.04f	Fiber Optic Line	7421	LF	$ 200.00	$ 1,484,200
3.04g	Gas Lines (EPNG)	2708	LF	$ 300.00	$ 812,400
3.04h	Communication Tower to be relocated	2	LS	$ 400,000.00	$ 800,000
				Subtotal Utilities	$ 19,326,078
				Contingencies (10%)	$ 4,188,711
SUBTOTAL UTILITIES AND DRAINAGE					**$ 46,075,818**
4.0 MISCELLANEOUS					
4.01	Prepare ROW	205	AC	$ 25,000.00	$ 5,119,602
4.02	Demolition - Pavement	79396	SY	$ 11.18	$ 887,644
4.03	Demolition - Concrete	6013	SY	$ 8.50	$ 51,112
4.04	Demolition - Bridge Structures	221614	SF	$ 12.00	$ 2,659,368
4.05	Demolition - Buildings	56	EA	$ 15,000.00	$ 840,000
4.06	Railroad Relocation	10288	LF	$ 1,000.00	$ 10,288,000
4.07	Small Signs	1885	SF	$ 30.27	$ 57,059
4.08	Small Sign Supports	161	EA	$ 603.08	$ 97,096
4.09	Large Signs	10618	SF	$ 26.00	$ 276,068
4.10a	Cantilever Overhead Sign Support (Monotube)	18	EA	$ 92,000.00	$ 1,656,000
4.10b	Overhead Sign Bridge	5	EA	$ 90,000.00	$ 450,000
4.10c	Overhead Sign Bridge (Monotube)	13	EA	$ 225,000.00	$ 2,925,000
4.10d	Concrete Sign Columns (Aesthetics)	8	EA	$ 40,000.00	$ 320,000
4.10e	Ground Mount	11	EA	$ 4,000.00	$ 44,000
4.11	Intersection Signalization	7	EA	$ 150,000.00	$ 1,050,000
4.12	Luminaires	23.0	EA	$ 10,587.00	$ 243,501
4.13	High Mast Illumination	48.0	EA	$ 66,700.00	$ 3,201,600
4.14	Illumination (Underpass)	1	LS	$ 705,498	$ 705,498
4.15	Landscape	394	STA	$ 5,000.00	$ 1,970,000
4.16	SWPPP	394	STA	$ 5,000.00	$ 1,970,000
4.17	Gravel Access Road	50236	SY	$ 30.00	$ 1,507,080
4.17b	Cell Tower	1	EA	$ 400,000.00	$ 400,000
				Contingencies (10%)	$ 3,671,863
4.18	Mobilization / ROW Prep (10%)	1	LS	$ 40,024,363	$ 40,024,363
4.19a	Traffic Control (existing roadway) (10%)	1	LS	$ -	$ -
4.19b	Traffic Control (new location) (2%)	1	LS	$ 8,004,873	$ 8,004,873
4.20	Environmental Mitigation (2%)	1	LS	$ 8,004,873	$ 8,004,873
4.21	Misc. Unquantified Small Item Construction (5%)	1	LS	$ 20,012,182	$ 20,012,182
SUBTOTAL MISCELLANEOUS					**$ 116,436,781**
5.0 GANTRIES AND ITS					
5.01	CCTV	10	EACH	$ 30,000	$ 300,000
5.02	Dynamic Messaging Sign	2	EACH	$ 250,000	$ 500,000
5.03	Pavement Sensors	10	EACH	$ 20,000	$ 200,000
5.04	AVI Travel Time Sensors	10	EACH	$ 15,000	$ 150,000
5.05	Electronic Tolling Equipment	10	EACH	$ 80,000	$ 800,000
5.06	Fiber Optic (2 Operational Conduits)	914	STA	$ 5,700	$ 5,209,800
5.08	ETC Mainlane Gantry	2	EACH	$ 2,000,000	$ 4,000,000
5.09	ETC Ramp Gantry	6	EACH	$ 300,000	$ 1,800,000
5.10	Concrete Columns (Aesthetics)	8	EACH	$ 40,000	$ 320,000
				Contingencies (10%)	$ 1,593,576
SUBTOTAL GANTRIES AND ITS					**$ 17,529,336**
TOTAL CONSTRUCTION					**$ 479,961,785**
6.0 ENGINEERING AND TECHNICAL SERVICES					
6.01	Engineering Services (PS&E) (6%)	1	LS	$ 28,797,707	$ 28,797,707
6.02	Surveying (1%)	1	LS	$ 4,799,618	$ 4,799,618
6.03	Geotechnical (2%)	1	LS	$ 9,599,236	$ 9,599,236
6.04	Construction Management (6%)	1	LS	$ 28,797,707	$ 28,797,707
6.05	Materials Testing (2%)	1	LS	$ 9,599,236	$ 9,599,236
SUBTOTAL ENGINEERING AND TECHNICAL SERVICES					**$ 81,593,504**

COST SUMMARY		
Construction	$	479,961,785
Right-of-Way	$	114,663,296
Engineering and Technical Services	$	81,593,504
Utility Relocation (Calculated in Section 3, and including 10% Contingency)	$	23,191,294
TOTAL COST	$	677,000,000

PRELIMINARY ESTIMATE OF PROBABLE COSTS OF CONSTRUCTION
BORDER HIGHWAY WEST (LOOP 375) CORRIDOR E.I.S.
JANUARY 2013 DRAFT 100% SCHEMATIC - COLES-PAISANO INTERCHANGE

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT COST	SUBTOTAL COST
1.0 ROADWAY					
1.01	Main Lane Pavement	0.0	SY	$ 50.00	$ -
1.02	Ramp Pavement	20893.0	SY	$ 50.00	$ 1,044,650
1.03	Surface Street/Frontage Pavement	27480.0	SY	$ 50.00	$ 1,374,000
1.04	Sidewalk	3500.8	SY	$ 45.00	$ 157,535
1.05	Concrete Traffic Barrier	4900	LF	$ 48.00	$ 235,200
1.06	Curb and Gutter	7591	LF	$ 14.00	$ 106,274
1.07	Pedestrian Ramps	30	EACH	$ 1,110.00	$ 33,300
1.08	Pedestrian Rails		LF	$ 90.00	$ -
1.09	Pavement Striping (Solid White)	14650	LF	$ 0.35	$ 5,128
1.10	Pavement Striping (Broken)	18600	LF	$ 0.40	$ 7,440
1.11	Pavement Striping (Solid Yellow)	11360	LF	$ 0.35	$ 3,976
1.12	RPM	558	EACH	$ 2.80	$ 1,562
1.13	Embankment	168	CY	$ 11.32	$ 1,902
1.14	Excavation	20726	CY	$ 9.26	$ 191,923
				Contingencies (10%)	$ 316,289
SUBTOTAL ROADWAY					**$ 3,479,178**
2.0 STRUCTURES					
2.01	Main Lane Bridge (I-Girder)	0	SF	$ 85.00	$ -
2.02	Main Lane Bridge (Straddle Bent Spans)	0	SF	$ 85.00	$ -
2.03	Main Lane Bridge (Long steel/segment)	0	SF	$ 175.00	$ -
2.04	Ramp Bridge (I-Girder)	103623	SF	$ 85.00	$ 8,807,955
2.05	Ramp Bridge (Straddle Bent Spans)	0	SF	$ 85.00	$ -
2.06	Ramp Bridge (Long steel/segmental)	5040	SF	$ 175.00	$ 882,000
2.07	Surface St./Frontage Rd. Bridge (Std.)	10571	SF	$ 85.00	$ 898,535
2.08	Railroad Crash Wall	20	LF	$ 560.00	$ 11,200
2.09	Parking Deck over Detention Ponds	0	SF	$ 65.00	$ -
2.10	MSE Wall (Below Grade)	0	SF	$ 60.00	$ -
2.11	MSE Wall (Above Grade)	45989	SF	$ 33.00	$ 1,517,638
				Contingencies (10%)	$ 1,211,733
SUBTOTAL STRUCTURES					**$ 13,329,061**
3.0 UTILITIES AND DRAINAGE					
3.01 RCP					
3.01a	24" RCP	1303	LF	$ 67.00	$ 87,301.00
3.01b	30" RCP	500	LF	$ 70.00	$ 35,000.00
3.01c	36" RCP	115	LF	$ 85.00	$ 9,775.00
3.01d	42" RCP	0	LF	$ 95.00	$ -
3.01e	48" RCP	0	LF	$ 105.00	$ -
3.01f	Forcemain	0	LF	$ 250.00	$ -
3.02 DRAINAGE STRUCTURES					
3.02a	Type AAD	18	EA	$ 6,000.00	$ 108,000.00
3.02b	Type C	7	EA	$ 5,000.00	$ 35,000.00
3.02c	Manholes	5	EA	$ 5,000.00	$ 25,000.00
3.02e	Outfall (Ponding Area)	3	EA	$ 20,000.00	$ 60,000.00
3.02f	Outfall (Rio Grande River)	3	EA	$ 50,000.00	$ 150,000.00
3.02m	Earthwork for Ponds	7000	CY	$ 10.00	$ 70,000.00
3.02n	2'x2' Concrete Box	0	LF	$ 100.00	$ -
3.02o	8'x6' Concrete Box	0	LF	$ 250.00	$ -
3.03 BRIDGE DRAINAGE					
3.03a	Deck Drain	20	EA	$ 2,500.00	$ 50,000.00
3.03b	12" PVC	50	LF	$ 50.00	$ 2,500.00
3.03c	15" PVC	50	LF	$ 60.00	$ 3,000.00
3.03g	18" Steel Pipe	1160	LF	$ 325.00	$ 377,000.00
3.03h	24" Steel Pipe		LF	$ 400.00	$ -
	Sub-Total Conceptual Drainage Improvements Cost				$ 1,012,576.00
3.04 UTILITIES					
3.04a	Electric OH	1345	LF	$ 100.00	$ 134,500
3.04b	Electric UG		LF	$ 200.00	$ -
3.04c	12" Water Line	1387	LF	$ 100.00	$ 138,700
3.04d	36" Sewer Line	2768	LF	$ 220.00	$ 608,960
3.04e	Gas Lines	277	LF	$ 30.00	$ 8,310
3.04f	Fiber Optic Line		LF	$ 200.00	$ -

Cost Exhibit 8

3.04g	Gas Lines (EPNG)		LF	$	300.00	$	-
					Subtotal Utilities	$	890,470
					Contingencies (10%)	$	190,305
SUBTOTAL UTILITIES AND DRAINAGE						**$**	**2,093,351**
4.0 MISCELLANEOUS							
4.01	Prepare ROW	27	AC	$	25,000.00	$	675,545
4.02	Demolition - Pavement	25379	SY	$	11.18	$	283,737
4.03	Demolition - Concrete		SY	$	8.50	$	-
4.04	Demolition - Bridge Structures	10570	SF	$	12.00	$	126,840
4.05	Demolition - Buildings	9	EA	$	15,000.00	$	135,000
4.06	Railroad Relocation	0	LF	$	1,000.00	$	-
4.07	Small Signs	1168.0	SF	$	30.27	$	35,355
4.08	Small Sign Supports	100	EA	$	603.08	$	60,308
4.09	Large Signs	634	SF	$	26.00	$	16,484
4.10a	Cantilever Overhead Sign Support (Monotube)	2	EA	$	92,000.00	$	184,000
4.10b	Overhead Sign Bridge	0	EA	$	90,000.00	$	-
4.10c	Overhead Sign Bridge (Monotube)	1	EA	$	225,000.00	$	225,000
4.10d	Concrete Sign Columns (Aesthetics)	0	EA	$	40,000.00	$	-
4.10e	Ground Mount	2	EA	$	4,000.00	$	8,000
4.11	Intersection Signalization	2	EA	$	150,000.00	$	300,000
4.12	Luminaires	0.0	EA	$	10,587.00	$	-
4.13	High Mast Illumination	6.0	EA	$	66,700.00	$	400,200
4.14	Illumination (Underpass)	1.0	LS	$	137,446	$	137,446
4.15	Landscape	123.2	STA	$	5,000.00	$	616,150
4.16	SWPPP	123.2	STA	$	5,000.00	$	616,150
4.17	Gravel Access Road	0.0	SY	$	30.00	$	-
					Contingencies (10%)	$	382,022
4.18	Mobilization / ROW Prep (10%)	1	LS	$	2,372,500	$	2,372,500
4.19a	Traffic Control (existing roadway) (10%)	1	LS	$	-	$	-
4.19b	Traffic Control (new location) (2%)	1	LS	$	474,500	$	474,500
4.2	Environmental Mitigation (2%)	1	LS	$	474,500	$	474,500
4.21	Miscellaneous construction (5%)	1	LS	$	1,186,250	$	1,186,250
SUBTOTAL MISCELLANEOUS						**$**	**8,709,988**
5.0 GANTRIES AND ITS							
5.01	CCTV	0	EACH	$	30,000	$	-
5.02	Dynamic Messaging Sign	0	EACH	$	250,000	$	-
5.03	Pavement Sensors	0	EACH	$	20,000	$	-
5.04	AVI Travel Time Sensors	0	EACH	$	15,000	$	-
5.05	Electronic Tolling Equipment	0	EACH	$	80,000	$	-
5.06	Fiber Optic (2 Operational Conduits)	160	STA	$	5,700	$	912,000
5.08	ETC Mainlane Gantry	0	EACH	$	2,000,000	$	-
5.09	ETC Ramp Gantry	0	EACH	$	300,000	$	-
5.10	Concrete Columns (Aesthetics)		EACH	$	40,000	$	-
					Contingencies (10%)	$	91,200
SUBTOTAL GANTRIES AND ITS						**$**	**1,003,200**
TOTAL CONSTRUCTION						**$**	**28,614,777**
6.0 ENGINEERING AND TECHNICAL SERVICES							
6.01	Engineering Services (PS&E) (6%)	1	LS	$	1,716,887	$	1,716,887
6.02	Surveying (1%)	1	LS	$	286,148	$	286,148
6.03	Geotechnical (2%)	1	LS	$	572,296	$	572,296
6.04	Construction Management (6%)	1	LS	$	1,716,887	$	1,716,887
6.05	Materials Testing (2%)	1	LS	$	572,296	$	572,296
SUBTOTAL ENGINEERING AND TECHNICAL SERVICES						**$**	**4,864,512**
COST SUMMARY							
Construction						**$**	**28,614,777**
Right-of-Way						**$**	**8,707,900**
Engineering and Technical Services						**$**	**4,864,512**
Utility Relocation (Calculated in Section 3, and including 10% Contingency)						**$**	**1,068,564**
TOTAL COST						**$**	**43,000,000**

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FEIS APPENDIX G-1

TECHNICAL MEMORANDUM

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TECHNICAL MEMORANDUM

TO:	Trinity Parkway Project Partner Agencies	**DATE:**	12-19-2013
FROM:	Kent Belaire	**AVO:**	17826/WO 77
EMAIL:	kbelaire@halff.com		
PROJECT:	**Trinity Parkway FEIS**		
SUBJECT:	**February 2008 CH2M Hill and October 2008 HVJ Phase II Analytical Data Review** **Trinity Floodway Borrow Area Environmental Evaluation**		

1. Introduction and Background

The engineering design for the Trinity Parkway (Alternative 3C) requires its construction on an embankment within the Dallas Floodway that would protect it from the 100-year flood. To maintain the hydraulic properties of the Dallas Floodway to ensure the safe conveyance of Standard Project Flood (SPF), all embankment material must originate within the floodplain. In response to the United States Army Corps of Engineers (USACE) inquiries, further studies have been conducted to characterize the geotechnical suitability of soil materials from the proposed borrow areas and to demonstrate an initial earthworks balance between the Trinity Parkway, the anticipated Dallas Floodway levee improvements adjacent to the Trinity Parkway, and the proposed borrow excavations. Future levee height raises and slope would be based on the levee remediation plans finalized as part of the Dallas Floodway Project. The analysis of the ten borrow sites indicated that there is enough suitable material for implementation of levee remediation plans and to fill the Alternative 3C.

Two recent environmental site investigations have been conducted to assess the presence of potential chemicals of concern (COCs) and the general environmental quality of soils in the Dallas River floodway within the project boundaries. The USACE is conducting the Upper Trinity River Interim Feasibility Study (FS) for the Dallas Floodway. The Interim FS is a multipurpose project that includes flood control, environmental restoration, and recreational development. CH2M Hill is contracted to perform the Interim FS to evaluate options to raise the levees to provide additional flood control along the Dallas Floodway. The Interim FS will include evaluating options to raise the levees, including needs to raise bridges and relocate utilities. As part of the Interim FS, a Phase II Environmental Site Assessment was conducted by CH2M Hill to characterize floodplain soils near bridges and utilities, and to evaluate the potential to use soils within the Dallas Floodway as part of levee construction. Soils were investigated in the Dallas Floodway along bridges, where utilities cross the levees, and in the area of the planned Trinity Lakes. The CH2M Hill Phase II included the collection of 192 soil samples from 96 soil borings for laboratory analysis of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total RCRA metals, herbicides, pesticides, and polychlorinated biphenyls (PCBs). One of the purposes of conducting the Phase II ESA was to determine if contaminants are present in

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floodplain soils at levels that exceed the Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) Tier I Residential Protective Concentration Levels (PCLs) for a 30-acre source area.

HVJ Associates, Inc. (HVJ) was retained by URS Corporation to complete a Phase II Environmental Site Assessment for the Trinity River Bridges and Utilities project area. The HVJ Phase II included the collection of 58 soil samples from 29 soil borings for laboratory analysis of RCRA metals, VOCs, polynuclear aromatic hydrocarbons (PAHs), and/or pesticides. The objective of the environmental investigation was to determine the presence of RCRA metals, VOCs, PAHs, and/or pesticide affected soil within potential excavation areas in the Dallas Floodway from upstream of Westmoreland Road to the Corinth Street viaduct and their potential impact to the design, construction and operation of the proposed facilities.

The City of Dallas is pursuing a Municipal Setting Designation (MSD) for the Dallas Floodway. The MSD boundary for the Dallas Floodway has been defined and surveyed and includes the proposed borrow sites evaluated for fill material required for implementation of the levee remediation plan and Alternative 3C. The MSD would restrict the use of shallow groundwater beneath the Dallas Floodway and eliminate ingestion of groundwater as a potential exposure pathway. Analytical data developed during the completion of the CH2M Hill and HVJ Phase II Environmental Site Assessments have been evaluated in accordance with applicable TCEQ TRRP PCLs based upon certification of the Dallas Floodway as a MSD. In addition, the environmental testing data has been evaluated in order to establish site specific background concentrations for metals within the Dallas Floodway. Potential human health and ecological exposure has been considered and mitigative measures that may be implemented during the design and construction of Alternative 3C have been identified to eliminate unacceptable exposure.

2. CH2M Hill Phase II ESA Summary of Investigation

A Phase II Environmental Site Assessment was conducted by CH2M Hill as part of the USACE Fort Worth District's, Upper Trinity River Interim FS for the Dallas Floodway. The area of investigation was bounded to the west by the Loop 12 bridge across the West Fork of the Trinity River, to the north by the State Highway 183 bridge across the Elm Fork of the Trinity River, and to south by the Corinth Street bridge across the Trinity River. The purpose of the Phase II was to characterize floodplain soils near bridges and utilities, to evaluate the potential to use soils within the Dallas Floodway as part of levee construction, and to evaluate the potential presence of contaminants exceeding the TCEQ TRRP Tier 1 Residential PCLs for a 30 acre source area in the floodplain soils.

The scope of services included:

- Installation of 96 direct-push soil borings within the Dallas Floodway;
- Collection of 192 soil samples from the soil borings for laboratory analysis of VOCs, SVOCs, RCRA metals, PCBs, herbicides, and pesticides;
- Collection and geotechnical analysis of 20 samples for grain size gradation, Atterberg Limits, and moisture content;

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- Surveying of the boring locations using a Global Positioning System (GPS);
- Management of wastes;
- Validation of the data;
- Preparation of a Data Usability Summary (DUS) Technical Memorandum for the laboratory data; and
- Preparation of a Phase II Report.

The investigation activities were conducted between October 29 and November 6, 2007. The 96 soil borings were labeled SB001 through SB096. Soil borings were advanced using direct-push technology to depths ranging from 6 feet to 15 feet below ground surface (bgs). Two soil samples were collected from each soil boring, one from the 0 to 2 feet interval and one sample from the bottom 2 feet of the boring. The samples collected for analytical analyses were submitted to SPL, Inc. in Houston, Texas for analysis of VOCs by EPA Method 5035/8260B, SVOCs by EPA Method 8270C, RCRA metals by EPA Method 6020A/7471A, pesticides by EPA Method 8081A, herbicides by EPA Method 8151A, and PCBs by EPA Method 8082. The soil boring locations are illustrated on the Sample Location Maps included as Attachment 1.

3. HVJ Summary of Investigation

A Phase II site investigation was conducted by HVJ Associates, Inc. for the Trinity River Bridges and Utilities project area. The investigation area was located from just upstream of Westmorland Road to the Corinth Street bridge. The purpose of the investigation was to determine the potential presence of total metals (8 RCRA), VOCs, PAHs, and/or pesticide affected soils within potential lake and channel excavation areas in the Dallas Floodway and the potential impacts to the design, construction, and operation of the areas.

The scope of the investigation included:

- Installation of 29 soil borings; and
- Collection of two soil samples from each soil boring for laboratory analysis.

The investigation activities were conducted between October 7 and October 9, 2008. The 29 soil borings were labeled EB-1 through EB-29. The soil borings were advanced using direct-push technology to depths ranging from 6 feet to 20 feet bgs. Two soil samples were collected from each soil boring, one from the 0 to 4 foot interval and one from the 4 to 8 foot interval with the exceptions of soil borings EB-13 and EB-15 which were sampled from the 4 to 6 foot interval. The samples were submitted for laboratory analyses to XENCO Laboratories in Dallas, Texas for analysis of VOCs by EPA Method 8260B, PAHs by EPA Method 8270C, RCRA metals by EPA Method 6010B/7471A, and/or pesticides by EPA Method 8081A. The soil boring locations are illustrated on the Sample Location Maps included as Attachment 1

4. *Data Evaluation*

a. *Trinity Floodway*

A total of 192 soil samples were collected from 96 soil borings in the Dallas Floodway and submitted for laboratory analyses during the CH2M Hill Phase II. The analytical results indicated that concentrations of VOCs, SVOCs, metals, pesticides, herbicides, and PCBs were identified above the laboratory sample detection limits. The Phase II Report compared the identified concentrations to the TRRP Tier 1 Residential PCLs for a 30 acre source. The identified concentrations of the COCs in the soil samples were re-evaluated in accordance with the TRRP rules to establish Critical Residential PCLs for the COCs. Under TRRP, potential exposure pathways are evaluated to identify the exposure pathways that are complete or reasonably complete. Based on the evaluation, two potential exposure pathways, the human health exposure pathway and the ecological pathway, were determined to be complete or reasonably complete. Since a MSD is being pursued for the Dallas Floodway, the residential non-ingestion PCLs were used for the human health exposure pathway. The TRRP ecological soil screening level (SSL) benchmarks, where developed, were used for the ecological pathway. If a SSL was not established under TRRP, the EPA Region 5 Ecological Screening Levels (ESLs) were used. Under TRRP, Texas-Specific Background Concentrations (TSBC) have been established for selected naturally occurring metals and, as detailed below, Site-Specific Background Concentrations (SSBC) for selected naturally occurring metals were developed for the Dallas Floodway. The Residential non-ingestion PCLs, the ecological benchmarks, the Texas-Specific Background Concentrations, and the Site-Specific Background Concentrations were compared to determine the applicable Critical Residential PCLs for the Dallas Floodway area. The concentrations of COCs identified in the soils in the Dallas Floodway area were then compared to the Critical Residential PCLs to determine if affected soil was present in the Dallas Floodway.

The comparison of the identified COC concentrations in soil samples to the Critical Residential PCLs indicated that four soil borings (SB016, SB031, SB032, and SB061) contained concentrations of COCs that exceeded the Critical Residential PCLs. Soil boring locations SB016, SB031, and SB061 were outside of the proposed borrow areas. One sample collected from soil boring SB032, located within one of the proposed borrow areas, contained concentrations of arsenic and barium which exceeded the Critical Residential PCLs established for the Dallas Floodway and is discussed below. The identified concentrations of metals, VOCs, SVOCs, herbicides, pesticides, and PCBs in the remaining samples were below the Critical Residential PCLs established for the Dallas Floodway. The analytical results for samples collected from the Trinity Floodway outside the borrow areas during the CH2M Hill investigation are included as Tables 1a, 1b, 1c, and 1d (Attachment 2). The analytical results for samples collected from the Trinity Floodway within the borrow areas during the CH2M Hill investigation are included as Tables 2a through 2d (Attachment 2). The re-evaluation of the Dallas Floodway soil data indicated that the identified COCs are widely distributed within the floodway and may be considered anthropogenic background for the area.

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b. Borrow Area Evaluation

A total of 58 soil samples were collected from 29 soil borings in the proposed borrow areas of the Dallas Floodway and submitted for laboratory analyses during the HVJ Phase II. The analytical results indicated that concentrations of metals, VOCs, PAHs, and pesticides were identified above the laboratory sample detection limits within the proposed borrow areas. The concentrations of COCs identified in the soil samples were compared to the Critical Residential PCLs established for the Dallas Floodway during the data re-evaluation as discussed above. Three (3) soil samples, two soil samples from the eastern portion of Borrow Site A (HVJ sample EB-5, 4-8 feet and HVJ sample EB-6, 4-8 feet) and one sample from central portion of Borrow Site J (HVJ sample EB-24, 4-8 feet) contained concentrations of potential COCs exceeding the TRRP Soil Ecological Benchmarks (see Appendix G-1, Map 3). The analytical results for samples collected from the proposed borrow areas during the CH2M Hill Phase II are included as Tables 2a through 2d (Attachment 2) and the analytical results for samples collected from the borrow areas during the HVJ Phase II are summarized in Tables 3a through 3d (Attachment 2). Further evaluation of samples from the borrow areas exceeding Critical PCLs is discussed in detail below. Based on the comparison, the remaining identified COC concentrations in samples collected during the HVJ Phase II from the proposed borrow areas were below the established Critical Residential PCLs.

c. Background Calculations

A Phase II Environmental Site Assessment was completed for the Dallas Floodway by CH2M Hill for the USACE in February 2008. The investigation was conducted to characterize the floodplain soils near bridges and utilities and to evaluate the potential use of soils within the Dallas Floodway for levee construction. The soils were investigated in the Dallas Floodway at areas where utilities crossed the levees, along bridges, and in the areas of the planned Trinity Lakes. The investigation included the installation of 96 boring locations and collection of 192 soil samples for laboratory analysis. The samples were analyzed for volatile organic compounds, SVOCs, pesticides, PCBs, RCRA metals, and herbicides. The analytical results were evaluated against the TRRP Tier 1 Residential PCLs for a 30-acre source area and the TSSBCs for metals. According to the report, no herbicides or PCBs exceeded the TRRP Tier 1 Residential PCLs for a 30-acre source. Concentrations of the VOCs methylene chloride, tetrachloroethylene, and trichloroethene, the SVOC 4-nitrophenol, and the pesticide dieldrin were identified in the soil samples that exceeded the groundwater ingestion Tier 1 Residential PCL. The report indicated that methylene chloride was identified in laboratory blanks and may be a laboratory artifact. The SVOC benzo(a)pyrene exceeded the direct contact (total soil combined) Tier 1 Residential PCL at two locations. Concentrations of metals that exceeded the groundwater ingestion Tier 1 Residential PCLs or TSSBCs for metals were identified across the Dallas Floodway. CH2M Hill stated that the metal exceedances were mostly at low concentrations and were most likely the result of anthropogenic sources through airborne deposition. A concentration of lead was identified in one sample that exceeded the direct contact (total soil combined) Tier 1 Residential PCL. CH2M Hill indicated that the elevated lead concentration identified in the sample was associated with the sample containing elevated concentrations of benzo(a)pyrene.

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The Trinity River Watershed upstream of the project area and along the Dallas Floodway is highly urbanized. Urban storm water runoff carries pollutants from many sources including automobiles, oil and grease on roads, atmospheric deposition, processing and salvaging plants, waste water effluent, chemical spills, pet wastes, industrial plants, construction site erosion, and the disposal of chemicals used in homes and offices. As noted above, the Trinity River as it passes through the Dallas Floodway also receives the inflow from storm sewers from highly urbanized areas, which would be expected to contain a variety of pollutants, including bacteria, oil and grease, heavy metals, toxic substances, and trash and debris. Extensive historical agricultural use was prevalent throughout the area surrounding the City of Dallas that drained into the Trinity River Watershed upstream of the Dallas Floodway. Gravel mining had also historically occurred along the Trinity River Floodplain in the City of Dallas. In the Dallas/Fort Worth (DFW) area, historic challenges to water quality, soils, and sediments in and along the Trinity River are linked to the use of pesticides, insecticides, and fertilizers for agricultural operations upstream, as well as point and non-point discharges from industrial and urban areas. A City of Dallas Lead Study conducted in 1985 established a background lead concentration of 327 parts per million (PPM) for the area surrounding central Dallas including the portion of the Dallas Floodway comprising the project area.

Based upon the widespread non-point source urban, industrial, and agricultural use of the upstream areas for the Dallas Floodway, a statistical analysis was conducted to evaluate overall anthropogenic background levels for metals in the soils of the Dallas Floodway based upon data developed during the CH2M Hill Phase II.

Background Statistical Calculations

Halff used the data collected by CH2M Hill in the 2008 Phase II Environmental Site Assessment of the Dallas Floodway to evaluate the SSBCs for arsenic, barium, chromium, and selenium in the soils of the floodway. Out of the 192 soil samples analyzed by CH2M Hill, Halff used 159 samples to calculate the SSBCs. Halff used the following methodology to determine which samples to use to calculate the SSBCs:

- Soil samples collected outside of the Dallas Floodway were excluded from the SSBC calculations;
- Soil samples collected from the borrow areas were excluded from the SSBC calculations;
- Soil samples containing COC concentrations that did not appear to be representative of the background (unaffected) conditions were excluded from the SSBC calculations; and
- Soil samples determined to be statistical outliers were excluded from the data set until Normality was reached for all four metals.

The Site-specific background analysis was performed within established guidelines approved by the TCEQ and the Environmental Protection Agency (EPA). The statistical method used to determine background levels for Priority Pollutant metals is set forth in the EPA guidance document “Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Interim Final Guidance” (1989) and the “Addendum to Interim Final Guidance” (US EPA, 1992). The EPA calculation determines the 95% confidence interval for the background data set. The procedures for determining the 95% confidence interval are as follows:

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- Test the data for normal distribution;
- Eliminate any identified outliers (if the outlier has been determined to not be a valid extreme observation);
- Calculate the mean (M) and the standard deviation (SD); and
- Calculate the tolerance limit (TL) by the following equation:

TL = K(SD);
Where K = constant based on sample size; and
calculate the 95% confidence interval according to the following equation:
95% Confidence Interval = Mean + TL.

This method assumes that the data is normally distributed around the mean. The 95% confidence interval is taken as the mean plus a correction based on the standard deviation.

Calculations were performed for normality, skewness, and outliers. A copy of the statistical analysis tests are presented in Attachment 3. Based on the calculations, the arsenic, barium, chromium, and selenium data is normally distributed about the mean. The summary statistics for the data are as follows:

<u>Arsenic</u>

- Mean 6.481 mg/kg
- Standard Deviation 2.967 mg/kg
- Coefficient of Variance 0.458
- 95% Confidence Interval 13.282 mg/kg

TL = K(SD);
Where K = 2.292
95% Confidence Interval = Mean + TL
= 6.481 + 2.292(2.967)
= 6.481 + 6.800

Arsenic Site-Specific Background = **13.28 mg/kg**

<u>Barium</u>

- Mean 136.848 mg/kg
- Standard Deviation 60.652 mg/kg
- Coefficient of Variance 0.443
- 95% Confidence Interval 275.862 mg/kg

TL = K(SD);
Where K = 2.292
95% Confidence Interval = Mean + TL
= 136.848 + 2.292(60.652)
= 136.848 + 139.014

Barium Site-Specific Background = **275.86 mg/kg**

Chromium

- Mean 21.607 mg/kg
- Standard Deviation 7.912 mg/kg
- Coefficient of Variance 0.367
- 95% Confidence Interval 39.740 mg/kg

TL = K(SD);
Where K = 2.292
95% Confidence Interval = Mean + TL
= 21.607 + 2.292(7.912)
= 21.607 + 18.134

Chromium Site-Specific Background = **39.74 mg/kg**

Selenium

- Mean 0.500 mg/kg
- Standard Deviation 0.281 mg/kg
- Coefficient of Variance 0.562
- 95% Confidence Interval 1.145 mg/kg

TL = K(SD);
Where K = 2.292
95% Confidence Interval = Mean + TL
= 0.500 + 2.292(0.281)
= 0.500 + 0.644

Selenium Site-Specific Background = **1.14 mg/kg**

5. Excavation/Borrow Sites - Potential Areas of Concerns

As noted previously, the City of Dallas is pursuing a MSD for the Dallas Floodway. A significant amount of environmental sampling data has recently been developed for shallow soils in the Dallas Floodway within the MSD area. Shallow soils from the borrow sites will be used as borrow material for the construction of embankment for the Trinity Parkway. Fifty eight (58) soil samples were collected from the borrow sites for laboratory analyses during the Phase II completed by HVJ in November 2008. One hundred ninety two (192) soil samples were collected from the Dallas Floodway for laboratory analyses during the Phase II completed by CH2M Hill in February 2008. Fourteen (14) of the soil samples collected during the CH2M Hill Phase II were collected from the borrow sites. Data developed during the Phase II site investigations was evaluated in accordance with TCEQ TRRP procedures and the guidelines provided in “Evaluation of Dredge Material Proposed for Discharge in Waters of the U.S. – Testing Manual” (US EPA, 1998).

A MSD will restrict the use of shallow groundwater beneath the Dallas Floodway and eliminate ingestion of groundwater as a potential exposure pathway. Soil analytical data from the floodway corridor were reviewed and the concentrations of COCs were compared to TRRP PCLs with a MSD (TRRP Non-ingestion PCLs) and Soil Ecological Benchmarks. None of the soil samples collected from the proposed borrow areas contained concentrations of potential COCs exceeding the TRRP Non-ingestion PCLs. Only four (4) soil samples, two soil samples from the eastern portion of Borrow Site A (HVJ sample EB-5, 4-8 feet and HVJ sample EB-6, 4-8 feet), one soil sample from the southern portion of Borrow Site E (CH2M Hill sample SB-32, 0-2 feet), and one sample from central portion of Borrow Site J (HVJ sample EB-24, 4-8 feet) contained concentrations of potential COCs exceeding the TRRP Soil Ecological Benchmarks. Concentrations of barium and chromium exceeding the Soil Ecological Benchmarks were identified in Borrow Site A, concentrations of arsenic, barium, and chromium exceeding the Soil Ecological Benchmarks were identified in Borrow Site E, and concentrations of selenium exceeding the Soil Ecological Benchmarks were identified in Borrow Site J. None of the samples collected from the proposed borrow areas contained concentrations of VOCs, SVOCs/PAHs, herbicides, pesticides, and/or PCBs exceeding Soil Ecological Benchmarks.

6. Management and Mitigative Measures

Evaluation of environmental testing data from the Phase II site investigations indicate that borrow material required for construction of Alternative 3C does not contain concentrations of potential COCs exceeding TRRP Non-ingestion PCLs or SSBCs established for the Dallas Floodway. Four soil samples collected from three of the proposed borrow sites contained concentrations of COCs exceeding the Soil Ecological Benchmarks and/or SSBCs established for the area. Only localized areas within the borrow sites exceeding the Soil Ecological Benchmarks or SSBCs will require special handling or management in order to eliminate potential unacceptable ecological exposure. Existing data indicate that a small percentage (approximately 50,000 cubic yards (cy) of the total 3.06 million cy) of fill material from the proposed borrow areas needed for construction of Alternative 3C contains COC concentrations exceeding Ecological Benchmarks.

Re-use of fill containing COCs above ecological benchmarks would be used within the core of the roadway embedment (i.e., re-used as subsurface soil) thus eliminating potential future ecological exposure. Re-use of fill material containing COCs above the ecological benchmarks within the core of the roadway embedment would:

- Result in conditions protective of ecological receptors that may frequent the area and use less mobile receptors (e.g., plants, soil invertebrates, small rodents) as a food source;
- Result in conditions protective of benthic invertebrates within waters of the State; and
- Result in conditions that eliminate potential exposure of ecological receptors to bioaccumulative COCs.

Mitigation of potential ecological exposure would be addressed through:

- Delineation and quantification of fill material exceeding Soil Ecological Benchmarks during project design; and
- Development of a soil management plan (SMP) detailing procedures to properly manage the excavation and re-use of borrow material exceeding Soil Ecological Benchmarks.

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a. COC Affected Fill Delineation and Quantification

In the event alternative 3C is selected in the anticipated Record of Decision (ROD), additional data would be required to support the development of the SMP for re-use of soil from the borrow areas within the Trinity Floodway for Alternative 3C. Sufficient data must be developed to define the vertical and horizontal limits of soil containing COCs exceeding Soil Ecological Benchmarks that would require special handling and management during construction. The site investigation activities would be conducted during the design phase of the project and would focus on the following areas.

Borrow Site A – Concentrations of barium and chromium exceeding the Soil Ecological Benchmarks were identified in Borrow Site A (HVJ sample EB-5, 4-8 feet and HVJ sample EB-6, 4-8 feet). The horizontal and vertical extent of barium and chromium in soil within Borrow Site A would be determined through the installation of soil borings and analytical testing. Soil borings would be installed to the anticipated depth of the borrow area excavation (approximately 14 feet below ground surface [bgs]). An appropriate number of soil samples would be collected for laboratory analysis from each soil boring to develop data required to determine the vertical and horizontal extent of soil containing COCs exceeding the applicable Soil Ecological Benchmarks. Soil samples would be submitted for laboratory analysis of barium and chromium. Data developed during the delineation activities would be used to define the “COC affected areas” within Borrow Site A to be addressed in the SMP.

Borrow Site E – Concentrations of arsenic, barium, and chromium exceeding the Soil Ecological Benchmarks were identified in one soil sample (CH2M Hill sample SB-32, 0-2 feet) from the southern portion of Borrow Site E. The horizontal and vertical extent of arsenic, barium, and chromium in soil within Borrow Site E would be determined through the installation of soil borings and analytical testing. Soil borings would be installed to the anticipated depth of the borrow area excavation (approximately 12 feet bgs). An appropriate number of soil samples would be collected for laboratory analysis from each soil boring to develop data required to determine the vertical and horizontal extent of soil containing COCs exceeding the applicable Soil Ecological Benchmarks. Soil samples would be submitted for laboratory analysis of barium and chromium. Data developed during the delineation activities would be used to define the “COC affected areas” within Borrow Site E to be addressed in the SMP.

Borrow Site J – Concentrations of selenium exceeding the Soil Ecological Benchmarks were identified in one soil sample (HVJ sample EB-24, 4-8 feet) from the southern portion of Borrow Site J. The horizontal and vertical extent of arsenic, barium, and chromium in soil within Borrow Site J would be determined through the installation of soil borings and analytical testing. Soil borings would be installed to the anticipated depth of the borrow area excavation (approximately 10 feet bgs). An appropriate number of soil samples would be collected for laboratory analysis from each soil boring to develop data required to determine the vertical and horizontal extent of soil containing COCs exceeding the applicable Soil Ecological Benchmarks. Soil samples would be submitted for laboratory analysis of barium and chromium. Data developed during the delineation activities would be used to define the “COC affected areas” within Borrow Site J to be addressed in the SMP.

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b. Soil and Groundwater Management Plan Development and Implementation

A SMP would be developed as part of the design and bid package in support of construction of Alternative 3C. The SMP would be designed to aid the contractor in determining the appropriate course of action when excavating and transporting fill material with COCs exceeding the Soil Ecological Benchmarks area for use as roadway embankment fill. Implementation of the procedures detailed in the SMP would ensure that the COC affected soil is managed properly and re-used as fill only within the core of the roadway embankment during construction of Alternative 3C. The SMP would include the following to minimize adverse affects resulting from the re-use of fill material containing COCs exceeding Soil Ecological Benchmarks:

- The affected fill material would be re-used in a location where the substrate material in the re-use area is of similar composition to the fill material. The fill material would be placed within the core of the roadway embankment.

- The affected fill material would be encapsulated with unaffected floodway material, thus eliminating potential exposure to ecological receptors.

- Maintenance of the roadway would prevent the potential for erosion, slumping, or leaching affected fill material and prevent a potential future source of pollution.

General requirements for management of COC affected soil excavated from the borrow sites would be outlined in the SMP. Procedures for proper storage, sampling and analytical testing, transportation and re-use of COC affected soil would be identified.

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TECHNICAL MEMORANDUM

ATTACHMENT 1

FIGURES

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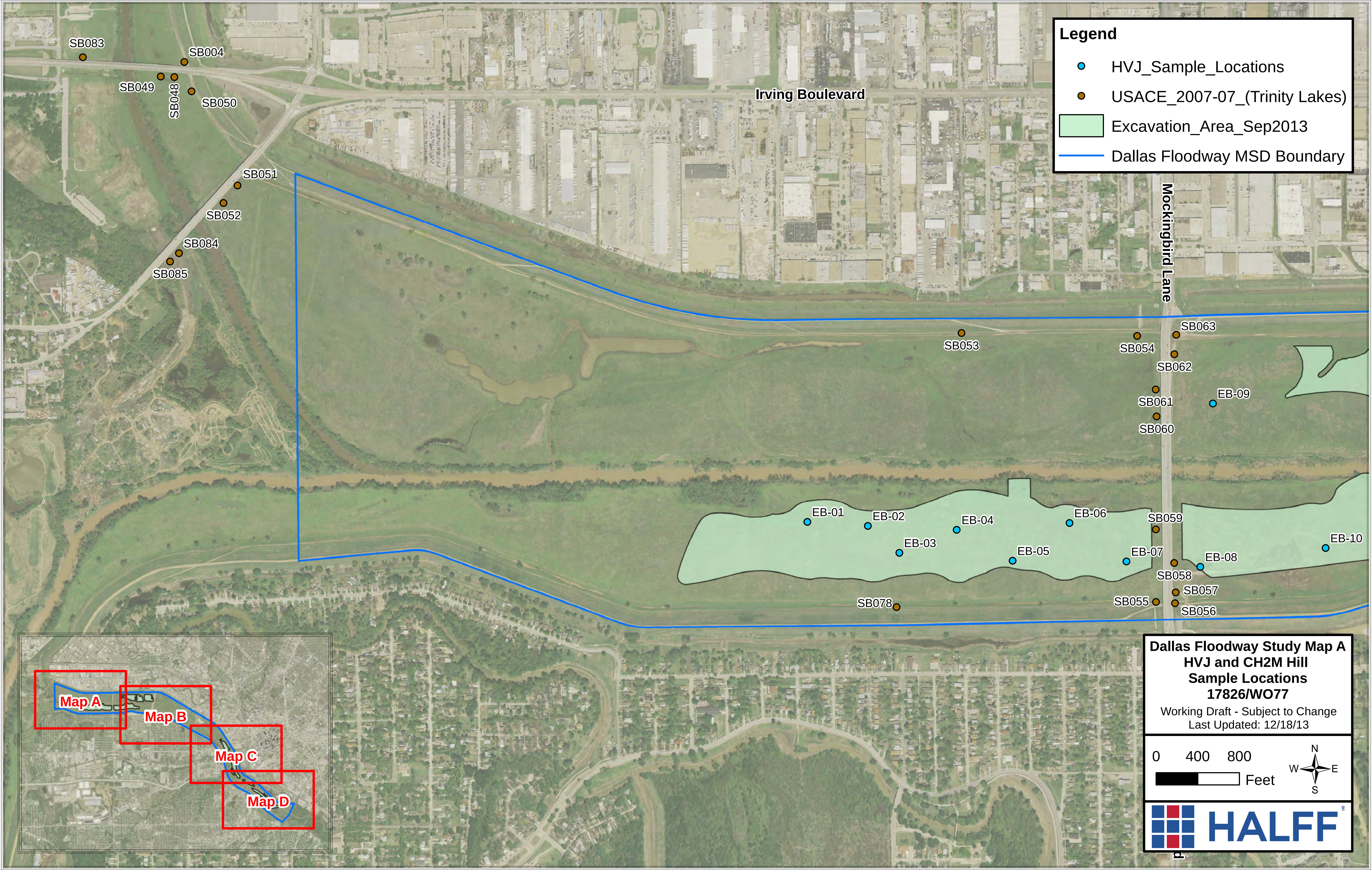
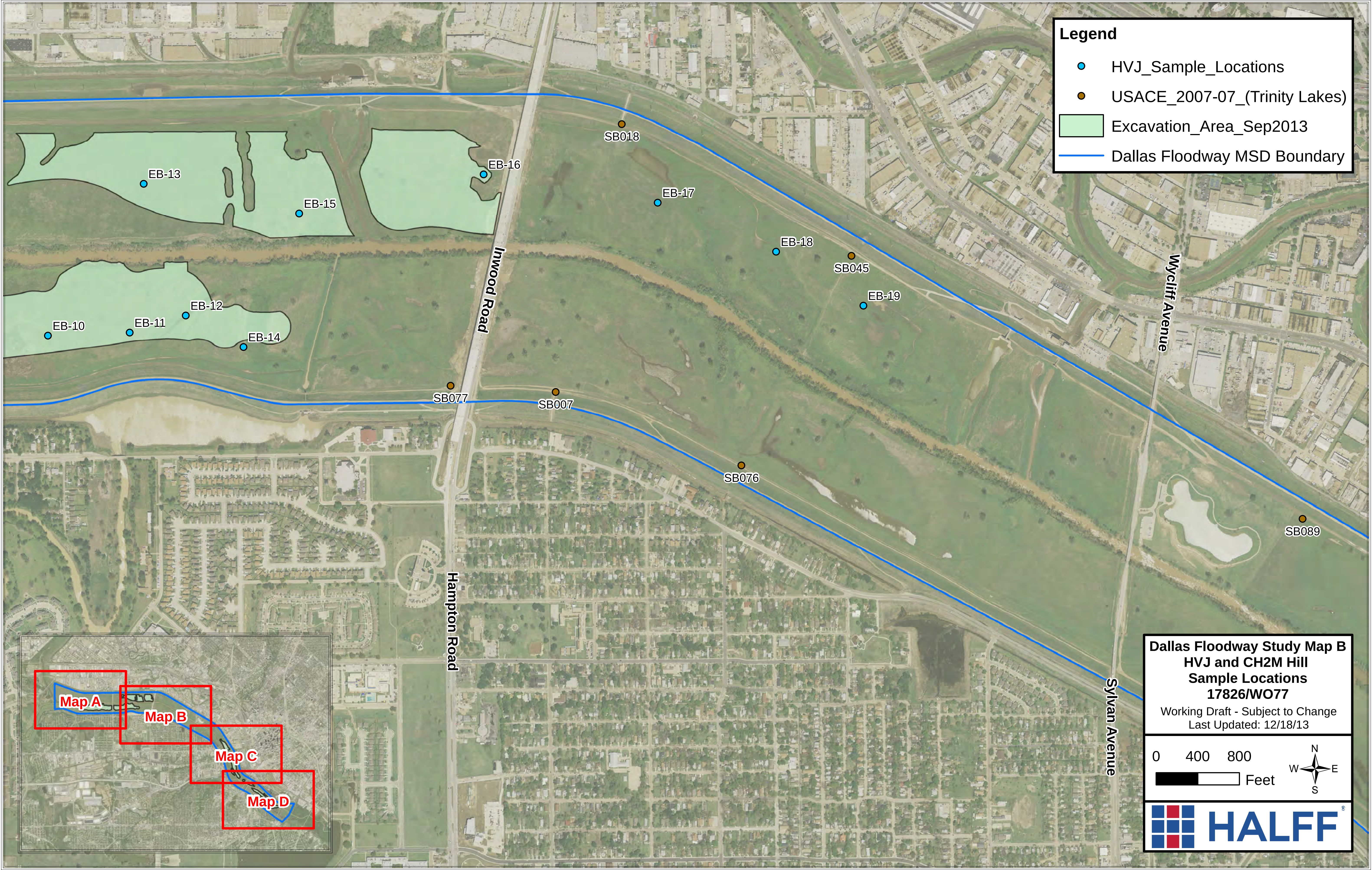


Legend
HVJ_Sample_Locations
USACE_2007-07_(Trinity Lakes)
Excavation_Area_Sep2013
Dallas Floodway MSD Boundary
Irving Boulevard
Mockingbird Lane
SB083
SB004
SB049
SB048
SB050
SB051
SB052
SB084
SB085
SB053
SB054
SB063
SB062
SB061
SB060
SB059
SB058
SB057
SB055
SB056
SB078
EB-01
EB-02
EB-03
EB-04
EB-05
EB-06
EB-07
EB-08
EB-09
EB-10
Map A
Map B
Map C
Map D
Dallas Floodway Study Map A
HVJ and CH2M Hill
Sample Locations
17826/WO77
Working Draft - Subject to Change
Last Updated: 12/18/13
0 400 800
Feet
N
W
E
S
HALFF



Legend
HVJ_Sample_Locations
USACE_2007-07_(Trinity Lakes)
Excavation_Area_Sep2013
Dallas Floodway MSD Boundary
EB-10
EB-11
EB-12
EB-13
EB-14
EB-15
EB-16
EB-17
EB-18
EB-19
SB018
SB045
SB077
SB007
SB076
SB089
Inwood Road
Hampton Road
Wycliff Avenue
Sylvan Avenue
Map A
Map B
Map C
Map D
Dallas Floodway Study Map B
HVJ and CH2M Hill
Sample Locations
17826/WO77
Working Draft - Subject to Change
Last Updated: 12/18/13
0 400 800
Feet
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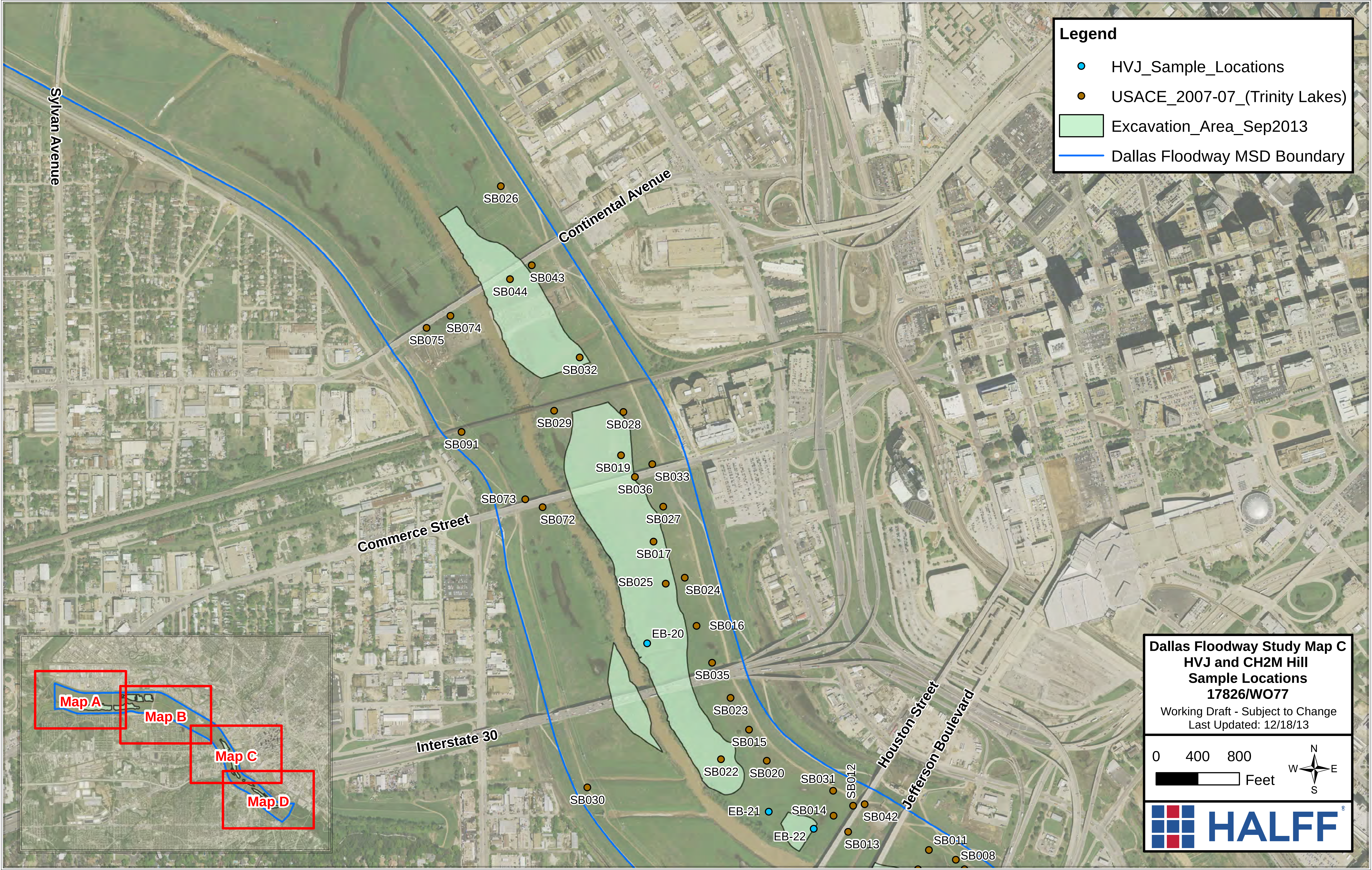
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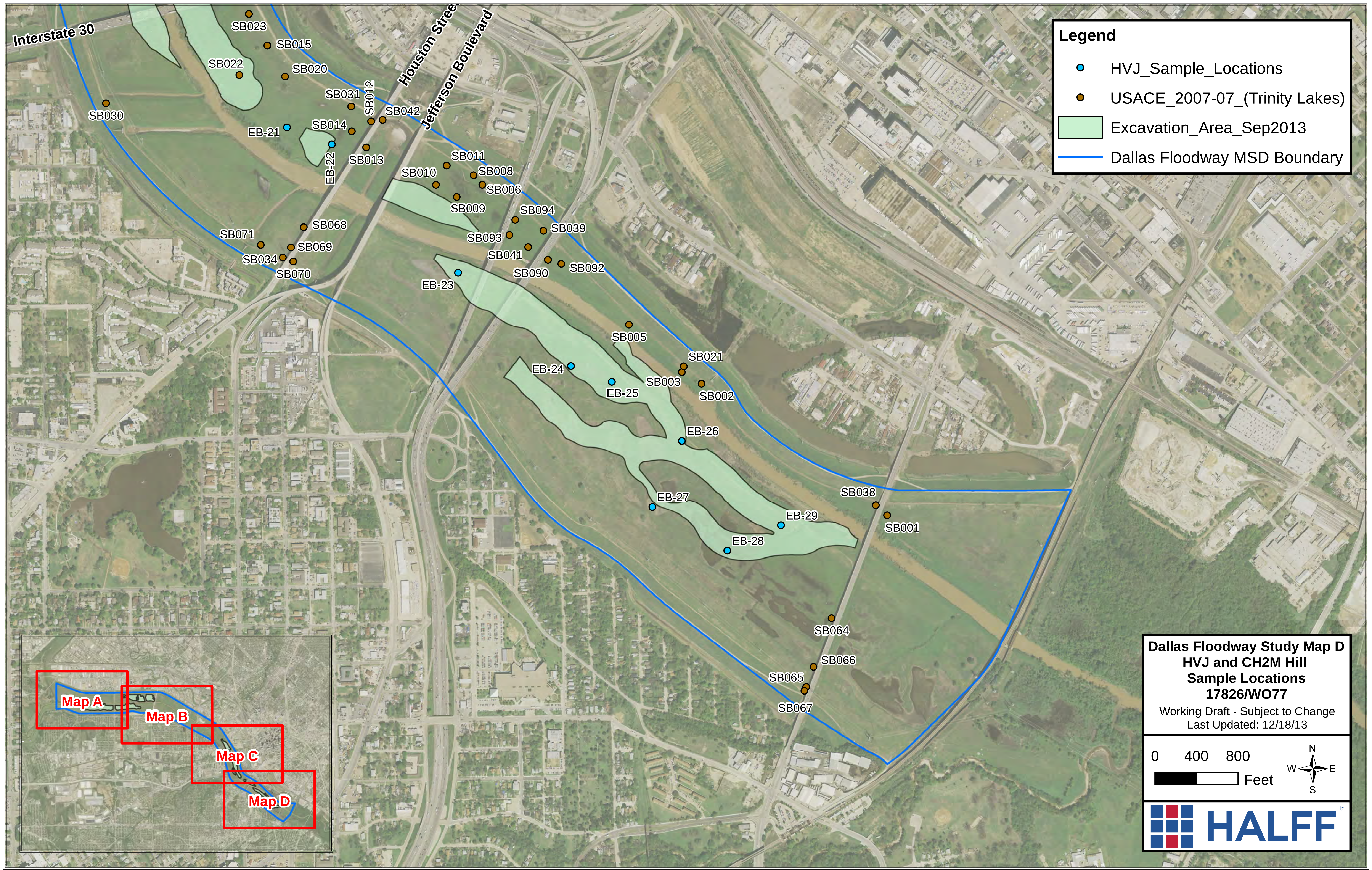
HVJ_Sample_Locations
USACE_2007-07_(Trinity Lakes)
Excavation_Area_Sep2013
Dallas Floodway MSD Boundary
Dallas Floodway Study Map C
HVJ and CH2M Hill
Sample Locations
17826/WO77
Working Draft - Subject to Change
Last Updated: 12/18/13
0 400 800
Feet
N
W
E
S
HALFF
Sylvan Avenue
Continental Avenue
Commerce Street
Interstate 30
Houston Street
Jefferson Boulevard
Map A
Map B
Map C
Map D
SB026
SB043
SB044
SB074
SB075
SB032
SB029
SB028
SB091
SB019
SB033
SB036
SB073
SB072
SB027
SB017
SB025
SB024
SB016
EB-20
SB035
SB023
SB015
SB022
SB020
SB031
SB012
SB030
EB-21
SB014
SB042
EB-22
SB013
SB011
SB008



Interstate 30
Houston Street
Jefferson Boulevard
SB023
SB015
SB022
SB020
SB031
SB012
SB042
SB030
EB-21
SB014
EB-22
SB013
SB011
SB010
SB008
SB006
SB009
SB094
SB039
SB068
SB071
SB069
SB034
SB070
SB093
SB041
SB090
SB092
EB-23
SB005
SB021
EB-24
EB-25
SB003
SB002
EB-26
EB-27
SB038
EB-29
SB001
EB-28
SB064
SB066
SB065
SB067
Legend
HVJ_Sample_Locations
USACE_2007-07_(Trinity Lakes)
Excavation_Area_Sep2013
Dallas Floodway MSD Boundary
Map A
Map B
Map C
Map D
Dallas Floodway Study Map D
HVJ and CH2M Hill
Sample Locations
17826/WO77
Working Draft - Subject to Change
Last Updated: 12/18/13
0 400 800
Feet
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HALFF

TECHNICAL MEMORANDUM

ATTACHMENT 2

TABLES

Table 1a
CH2M Hill Phase II ESA (Dallas Floodway, Upper Trinity River) Dated 2008 Analytical
Floodway Areas Only
SVOC
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Critical PCLs		SB003	SB006	SB008	SB011	SB011	SB015	SB016	SB016	SB020	SB020	SB024	SB029	SB031	SB031	SB033	SB035	SB061	SB064 FD	SB065	SB074
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Critical PCLs	Pathway	4'-6'	0-2'	0-2'	0-2'	6'-8'	0-2'	0-2'	2'-4'	0-2'	13'-15'	0-2'	9'-11	0-2'	4'-6'	0-2'	3'-5'	0-2'	0-2'	12'-14'	0-2'
Date:							10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/31/2007	11/2/2007	11/2/2007	10/31/2007	10/30/2007	11/1/2007	11/2/2007	11/2/2007	11/5/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SVOCs/PAHs:																										
4-Nitrophenol	130	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	130	$^{Tot}Soil_{Comb}$	<0.740	<0.770	<0.760	<0.810	<0.770	<0.760	<1.60	<1.50	<0.770	<0.840	<0.760	<0.800	<0.770	<0.790	<0.740	<0.820	<0.850	<0.880	<0.730	<0.800
Acenaphthene	3,000	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	3,000	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	0.240 J	<0.370	<0.200	<0.220	<0.200	<0.210	<0.200	0.25	<0.190	<0.210	<0.220	<0.230	<0.190	<0.210
Anthracene	18,000	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	18,000	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	0.48	<0.370	<0.200	<0.220	<0.200	<0.210	<0.200	0.63	<0.190	<0.210	<0.220	<0.230	<0.190	<0.210
Benzo(a)anthracene	5.7	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	5.7	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	1.00	0.180 J	0.120 J	<0.220	0.520	<0.210	0.110 J	1.4	0.110 J	<0.210	<0.220	0.150 J	<0.190	<0.210
Benzo(a)pyrene	0.56	$^{Tot}Soil_{Comb}$	850	$^{Air}Soil_{Inh-v}$	0.56	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	**0.810**	0.180 J	0.100 J	<0.220	0.470	<0.210	0.120 J	**1.3**	0.110 J	<0.210	<0.220	0.170 J	<0.190	<0.210
Benzo(b)fluoranthene	5.7	$^{Tot}Soil_{Comb}$	6,100	$^{Air}Soil_{Inh-v}$	5.7	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	0.930	0.140 J	0.100 J	<0.220	0.320	<0.210	0.100 J	1.3	0.097 J	<0.210	<0.220	0.27	<0.190	<0.210
Benzo(g,h,i)perylene	1,800	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	1,800	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	0.520	0.170 J	0.068 J	<0.220	0.250	<0.210	0.090 J	0.79	0.083 J	<0.210	<0.220	0.150 J	<0.190	<0.210
Benzo(k)fluoranthene	57	$^{Tot}Soil_{Comb}$	150,000	$^{Air}Soil_{Inh-v}$	57	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	0.620	0.150 J	0.100 J	<0.220	0.360	<0.210	0.110 J	0.98	0.096 J	<0.210	<0.220	0.210 J	<0.190	<0.210
Biphenyl	3,300	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	3,300	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	<0.410	<0.370	<0.200	<0.220	<0.200	<0.210	<0.200	0.027 J	<0.190	<0.210	<0.220	<0.230	<0.190	<0.210
Bis(2-Ethylhexyl) Phthalate	43	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	43	$^{Tot}Soil_{Comb}$	0.098 J	0.260	<0.190	<0.210	<0.200	0.046 J	<0.410	<0.370	<0.200	<0.220	<0.200	<0.210	<0.200	200 U	0.061 J	<0.210	<0.220	<0.230	<0.190	<0.210
Butyl Benzyl Phthalate	1,600	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	1,600	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	<0.410	<0.370	<0.200	<0.220	<0.200	<0.210	<0.200	200 U	<0.190	63 J	<0.220	<0.230	<0.190	<0.210
Carbazole	230	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	230	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	0.270 J	<0.370	<0.200	<0.220	<0.200	<0.210	<0.200	0.45	<0.190	<0.210	<0.220	<0.230	<0.190	<0.210
Chrysene	560	$^{Tot}Soil_{Comb}$	590,000	$^{Air}Soil_{Inh-v}$	560	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	1.00	0.200 J	0.130 J	<0.220	0.630	<0.210	0.120 J	1.4	0.120 J	<0.210	<0.220	0.27	<0.190	<0.210
Di-n-Butyl Phthalate	6,200	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	6,200	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	<0.410	<0.370	<0.200	<0.220	<0.200	<0.210	<0.200	200 U	<0.190	<0.210	<0.220	<0.230	0.040 J	0.042 J
Dibenz(a,h)anthracene	0.55	$^{Tot}Soil_{Comb}$	2,000	$^{Air}Soil_{Inh-v}$	0.55	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	<0.410	<0.370	<0.200	<0.220	<0.200	<0.210	<0.200	0.21	<0.190	<0.210	<0.220	<0.230	<0.190	<0.210
Dibenzofuran	270	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	270	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	<0.410	<0.370	<0.200	<0.220	<0.200	<0.210	<0.200	0.21	<0.190	<0.210	<0.220	<0.230	<0.190	<0.210
Fluoranthene	2,300	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	2,300	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	2.60	0.43	0.25	<0.220	0.520	0.083 J	0.23	3	0.27	<0.210	<0.220	0.48	<0.190	<0.210
Fluorene	2,300	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	2,300	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	0.230 J	<0.370	<0.200	<0.220	<0.200	<0.210	<0.200	0.21	<0.190	<0.210	<0.220	<0.230	<0.190	<0.210
Indeno(1,2,3-c,d)Pyrene	5.7	$^{Tot}Soil_{Comb}$	25,000	$^{Air}Soil_{Inh-v}$	5.7	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	0.66	0.140 J	0.073 J	<0.220	0.270	<0.210	0.097 J	0.98	0.091 J	<0.210	<0.220	0.150 J	<0.190	<0.210
Naphthalene	220	$^{Tot}Soil_{Comb}$	270	$^{Air}Soil_{Inh-v}$	220	$^{Tot}Soil_{Comb}$	<0.190	<0.200	<0.190	<0.210	<0.200	<0.190	0.45	<0.370	<0.200	<0.220	<0.200	<0.210	<0.200	0.170 J	<0.190	<0.210	<0.220	<0.230	<0.190	<0.210
Phenanthrene	1,700	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	1,700	$^{Tot}Soil_{Comb}$	<0.190	<0.200	0.030 J	0.025 J	0.027 J	<0.190	2.4	0.290 J	0.130 J	0.036 J	0.150 J	0.040 J	0.110 J	2.4	0.160 J	<0.210	<0.220	0.4	<0.190	<0.210
Pyrene	1,700	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	1,700	$^{Tot}Soil_{Comb}$	0.062 J	<0.200	0.052 J	<0.210	<0.200	<0.190	1.8	0.330 J	0.190 J	<0.220	0.890	0.065 J	0.200 J	2.5	0.21	<0.210	<0.057 J	0.48	<0.190	<0.210

Notes:
Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River Dated February 2008)
mg/kg - milligrams per kilogram
NE - Not Established
NA - Not Analyzed
J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
Exceedences of the $^{Tot}Soil_{Comb}$ PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

Table 1a
CH2M Hill Phase II ESA (Dallas Floodway, Upper Trinity River) Dated 2008 Analytical
Floodway Areas Only
SVOC
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Critical PCLs		SB074	SB075	SB080	SB081	SB085	SB086	SB087 FD	SB088	SB088 FD	SB091	SB094
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Critical PCLs	Pathway	13'-15'	13'-15'	0-2'	0-2'	12'-14'	0-2'	0-2'	0-2'	0-2'	4'-6'	0-2'
Date:							11/5/2007	11/5/2007	11/6/2007	11/5/2007	11/6/2007	11/6/2007	11/6/2007	11/6/2007	11/6/2007	11/5/2007	10/29/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SVOCs/PAHs:																	
4-Nitrophenol	130	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	130	$^{Tot}Soil_{Comb}$	<0.840	<0.880	<0.850	<0.750	<0.870	0.180 J	0.170 J	<0.850	0.160 J	<0.820	<0.810
Acenaphthene	3,000	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	3,000	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	0.079 J	<0.220	<0.210	<0.210
Anthracene	18,000	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	18,000	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	0.170 J	<0.220	<0.210	<0.210
Benzo(a)anthracene	5.7	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	5.7	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	0.25	<0.220	<0.210	<0.210
Benzo(a)pyrene	0.56	$^{Tot}Soil_{Comb}$	850	$^{Air}Soil_{Inh-v}$	0.56	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	0.140 J	<0.220	<0.210	<0.210
Benzo(b)fluoranthene	5.7	$^{Tot}Soil_{Comb}$	6,100	$^{Air}Soil_{Inh-v}$	5.7	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	0.095 J	<0.220	<0.210	<0.210
Benzo(g,h,i)perylene	1,800	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	1,800	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	0.190 J	<0.220	<0.210	<0.210
Benzo(k)fluoranthene	57	$^{Tot}Soil_{Comb}$	150,000	$^{Air}Soil_{Inh-v}$	57	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	<0.220	<0.220	<0.210	<0.210
Biphenyl	3,300	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	3,300	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	<0.220	<0.220	<0.210	<0.210
Bis(2-Ethylhexyl) Phthalate	43	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	43	$^{Tot}Soil_{Comb}$	<0.220	<0.230	0.074 J	0.048 J	0.120 J	<0.220	<0.230	<0.220	<0.220	<0.210	<0.210
Butyl Benzyl Phthalate	1,600	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	1,600	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	<0.220	<0.220	<0.210	<0.210
Carbazole	230	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	230	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	0.120 J	<0.220	<0.210	<0.210
Chrysene	560	$^{Tot}Soil_{Comb}$	590,000	$^{Air}Soil_{Inh-v}$	560	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	0.23	<0.220	<0.210	0.061 J
Di-n-Butyl Phthalate	6,200	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	6,200	$^{Tot}Soil_{Comb}$	0.036 J	0.040 J	<0.220	<0.190	<0.220	<0.220	<0.230	<0.220	<0.220	0.035 J	<0.210
Dibenz(a,h)anthracene	0.55	$^{Tot}Soil_{Comb}$	2,000	$^{Air}Soil_{Inh-v}$	0.55	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	0.100 J	<0.220	<0.210	<0.210
Dibenzofuran	270	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	270	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	0.047 J	<0.220	<0.210	<0.210
Fluoranthene	2,300	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	2,300	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	0.78	<0.220	<0.210	<0.210
Fluorene	2,300	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	2,300	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	0.084 J	<0.220	<0.210	<0.210
Indeno(1,2,3-c,d)Pyrene	5.7	$^{Tot}Soil_{Comb}$	25,000	$^{Air}Soil_{Inh-v}$	5.7	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	0.22	<0.220	<0.210	<0.210
Naphthalene	220	$^{Tot}Soil_{Comb}$	270	$^{Air}Soil_{Inh-v}$	220	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	0.066 J	<0.220	<0.210	<0.210
Phenanthrene	1,700	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	1,700	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	0.7	<0.220	<0.210	0.031 J
Pyrene	1,700	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	1,700	$^{Tot}Soil_{Comb}$	<0.220	<0.230	<0.220	<0.190	<0.220	<0.220	<0.230	0.61	<0.220	<0.210	<0.210

Notes:
Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River
Dated February 2008)
mg/kg - milligrams per kilogram
NE - Not Established
NA - Not Analyzed
J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
Exceedences of the $^{Tot}Soil_{Comb}$ PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated
June 29, 2012 and based upon a MSD certification for the Dallas Floodway

TABLE 1b
CH2M Hill Phase II ESA (Dallas Floodway, Upper Trinity River) Dated 2008 Analytical
Floodway Areas Only
VOCs
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Critical PCLs		SB007	SB007	SB010	SB011	SB014	SB020	SB024	SB027	SB030	SB061	SB064	SB067	SB069	SB074	SB075	SB076
Depth of sample:	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Critical PCLs	Pathway	0-2'	4'-6'	4'-6'	6'-8'	13'-15'	13'-15'	13'-15'	13'-15'	4'-6'	13'-15'	0-2'	0-2'	13'-15'	13'-15'	13'-15'	4'-6'
Date:							11/5/2007	11/5/2007	10/30/2007	10/29/2007	10/30/2007	10/30/2007	10/30/2007	10/31/2007	11/5/2007	11/1/2007	11/2/2007	11/2/2007	11/5/2007	11/5/2007	11/5/2007	11/5/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VOCs:																						
2-Butanone	40,000	^{Tot}Soil $_{Comb}$	200,000	^{Air}Soil $_{Inh-v}$	40,000	^{Tot}Soil $_{Comb}$	<0.011	0.013	<0.0093	<0.0087	<0.012	0.011	0.018	<0.0093	<0.010	<0.0058	0.0027 J	<0.011	<0.014	<0.011	0.019	<0.0088
Acetone	66,000	^{Tot}Soil $_{Comb}$	600,000	^{Air}Soil $_{Inh-v}$	66,000	^{Tot}Soil $_{Comb}$	<0.110	0.079 J	<0.0093	<0.087	<0.120	<0.094	<0.110	0.047 J	0.013 J	<0.058	<0.092	<0.110	0.017 J	29 J	0.16	0.031 J
Carbon Disulfide	4,600	^{Tot}Soil $_{Comb}$	11,000	^{Air}Soil $_{Inh-v}$	4,600	^{Tot}Soil $_{Comb}$	<0.0057	<0.004	0.00095 J	<0.0043	<0.0062	<0.0035	<0.0051	<0.0046	<0.005	<0.0029	<0.0046	<0.0056	<0.0068	<0.0055	<0.0057	<0.0044
Ethylbenzene	6,400	^{Tot}Soil $_{Comb}$	29,000	^{Air}Soil $_{Inh-v}$	6,400	^{Tot}Soil $_{Comb}$	<0.0057	<0.004	<0.0047	0.0024 J	<0.0062	<0.0035	<0.0051	<0.0046	<0.005	<0.0029	<0.0046	<0.0056	<0.0068	<0.0055	<0.0057	<0.0044
Freon-113	NE	^{Tot}Soil $_{Comb}$	NE	^{Air}Soil $_{Inh-v}$	NE	^{Tot}Soil $_{Comb}$	<0.0057	<0.004	<0.0047	<0.0043	<0.0062	<0.0035	<0.0051	<0.0046	<0.005	<0.0029	<0.0046	<0.0056	<0.0068	<0.0055	<0.0057	<0.0044
Methylcyclohexane	41,000	^{Tot}Soil $_{Comb}$	46,000	^{Air}Soil $_{Inh-v}$	41,000	^{Tot}Soil $_{Comb}$	<0.0057	<0.004	<0.0047	0.0047	<0.0062	<0.0035	<0.0051	<0.0046	<0.005	<0.0029	<0.0046	<0.0056	<0.0068	<0.0055	<0.0057	<0.0044
Methylene Chloride	480	^{Tot}Soil $_{Comb}$	13,000	^{Air}Soil $_{Inh-v}$	480	^{Tot}Soil $_{Comb}$	0.0084	<0.004	<0.0047	<0.0043	0.027	<0.0035	<0.0051	<0.0046	<0.005	<0.0029	<0.0046	0.015	<0.0068	<0.0055	<0.0057	<0.0044
Tetrachloroethylene	450	^{Tot}Soil $_{Comb}$	940	^{Air}Soil $_{Inh-v}$	450	^{Tot}Soil $_{Comb}$	<0.0057	<0.004	<0.0047	<0.0043	<0.0062	<0.0035	<0.0051	<0.0046	<0.005	3.6	<0.0046	<0.0056	<0.0068	<0.0055	<0.0057	<0.0044
Toluene	5,900	^{Tot}Soil $_{Comb}$	63,000	^{Air}Soil $_{Inh-v}$	5,900	^{Tot}Soil $_{Comb}$	<0.0057	<0.004	<0.0047	<0.0043	<0.0062	<0.0035	<0.0051	<0.0046	<0.005	<0.0029	<0.0046	0.0011 J	<0.0068	<0.0055	<0.0057	<0.0044
Trichloroethene	18	^{Tot}Soil $_{Comb}$	31	^{Air}Soil $_{Inh-v}$	18	^{Tot}Soil $_{Comb}$	<0.0057	<0.004	<0.0047	<0.0043	<0.0062	<0.0035	<0.0051	<0.0046	<0.005	0.046	<0.0046	<0.0056	<0.0068	<0.0055	<0.0057	<0.0044
m,p-Xylenes	8,900	^{Tot}Soil $_{Comb}$	9,400	^{Air}Soil $_{Inh-v}$	8,900	^{Tot}Soil $_{Comb}$	<0.0057	<0.004	<0.0047	0.017	<0.0062	<0.0035	<0.0051	<0.0046	<0.005	<0.0029	<0.0046	<0.0056	<0.0068	<0.0055	<0.0057	<0.0044
o-Xylene	48,000	^{Tot}Soil $_{Comb}$	68,000	^{Air}Soil $_{Inh-v}$	48,000	^{Tot}Soil $_{Comb}$	<0.0057	<0.004	<0.0047	0.0071	<0.0062	<0.0035	<0.0051	<0.0046	<0.005	<0.0029	<0.0046	<0.0056	<0.0068	<0.0055	<0.0057	<0.0044
Xylenes, Total	6,000	^{Tot}Soil $_{Comb}$	94,000	^{Air}Soil $_{Inh-v}$	6,000	^{Tot}Soil $_{Comb}$	<0.0057	<0.004	<0.0047	0.0241	<0.0062	<0.0035	<0.0051	<0.0046	<0.005	<0.0029	<0.0046	<0.0056	<0.0068	<0.0055	<0.0057	<0.0044

Notes:

Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River Dated February 2008)

mg/kg - milligrams per kilogram

NE - Not Established

NA - Not Analyzed

J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.

Exceedences of the ^{Tot}Soil $_{Comb}$ PCL are in **BOLD** text and highlighted in Orange

The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

TABLE 1b
CH2M Hill Phase II ESA (Dallas Floodway, Upper Trinity River) Dated 2008 Analytical
Floodway Areas Only
VOCs
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Critical PCLs		SB078	SB080	SB087	SB092	SB093
Depth of sample:	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Critical PCLs	Pathway	3'-5'	13'-15'	5'-7'	13'-15'	0-2'
Date:							11/5/2007	11/6/2007	11/6/2007	10/29/2007	10/29/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VOCs:											
2-Butanone	40,000	$^{Tot}Soil_{Comb}$	200,000	$^{Air}Soil_{Inh-v}$	40,000	$^{Tot}Soil_{Comb}$	<0.010	<0.011	<0.012	<0.0042	<0.012
Acetone	66,000	$^{Tot}Soil_{Comb}$	600,000	$^{Air}Soil_{Inh-v}$	66,000	$^{Tot}Soil_{Comb}$	0.022 J	0.039 J	0.033 J	0.0094 J	<0.120
Carbon Disulfide	4,600	$^{Tot}Soil_{Comb}$	11,000	$^{Air}Soil_{Inh-v}$	4,600	$^{Tot}Soil_{Comb}$	<0.0051	<0.0053	<0.0059	<0.0021	<0.006
Ethylbenzene	6,400	$^{Tot}Soil_{Comb}$	29,000	$^{Air}Soil_{Inh-v}$	6,400	$^{Tot}Soil_{Comb}$	<0.0051	<0.0053	<0.0059	<0.0021	<0.006
Freon-113	NE	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	NE	$^{Tot}Soil_{Comb}$	<0.0051	<0.0053	<0.0059	<0.0021	0.0072
Methylcyclohexane	41,000	$^{Tot}Soil_{Comb}$	46,000	$^{Air}Soil_{Inh-v}$	41,000	$^{Tot}Soil_{Comb}$	<0.0051	<0.0053	<0.0059	<0.0021	<0.006
Methylene Chloride	480	$^{Tot}Soil_{Comb}$	13,000	$^{Air}Soil_{Inh-v}$	480	$^{Tot}Soil_{Comb}$	<0.0051	<0.0053	<0.0059	<0.0021	<0.006
Tetrachloroethylene	450	$^{Tot}Soil_{Comb}$	940	$^{Air}Soil_{Inh-v}$	450	$^{Tot}Soil_{Comb}$	<0.0051	<0.0053	<0.0059	<0.0021	<0.006
Toluene	5,900	$^{Tot}Soil_{Comb}$	63,000	$^{Air}Soil_{Inh-v}$	5,900	$^{Tot}Soil_{Comb}$	<0.0051	<0.0053	<0.0059	<0.0021	0.0012 J
Trichloroethene	18	$^{Tot}Soil_{Comb}$	31	$^{Air}Soil_{Inh-v}$	18	$^{Tot}Soil_{Comb}$	<0.0051	<0.0053	<0.0059	<0.0021	<0.006
m,p-Xylenes	8,900	$^{Tot}Soil_{Comb}$	9,400	$^{Air}Soil_{Inh-v}$	8,900	$^{Tot}Soil_{Comb}$	<0.0051	<0.0053	<0.0059	<0.0021	<0.006
o-Xylene	48,000	$^{Tot}Soil_{Comb}$	68,000	$^{Air}Soil_{Inh-v}$	48,000	$^{Tot}Soil_{Comb}$	<0.0051	<0.0053	<0.0059	<0.0021	<0.006
Xylenes, Total	6,000	$^{Tot}Soil_{Comb}$	94,000	$^{Air}Soil_{Inh-v}$	6,000	$^{Tot}Soil_{Comb}$	<0.0051	<0.0053	<0.0059	<0.0021	<0.006

Notes:

Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River Dated February 2008)

mg/kg - milligrams per kilogram
NE - Not Established
NA - Not Analyzed
J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
Exceedences of the $^{Tot}Soil_{Comb}$ PCL are in **BOLD** text and highlighted in Orange

The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

TABLE 1c
CH2M Hill Phase II ESA (Dallas Floodway, Upper Trinity River) Dated 2008 Analytical
Floodway Areas Only
Metals
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Texas-Specific Background Concentration	Site Specific Background Concentration	Critical PCLs	
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway			Critical PCLs	Pathway
Date:								
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:								
Arsenic	24	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	5.9	13.28	24	$^{Tot}Soil_{Comb}$
Barium	8,100	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	300	275.86	8,100	$^{Tot}Soil_{Comb}$
Cadmium	52	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	NE	NE	52	$^{Tot}Soil_{Comb}$
Chromium	33,000	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	30	39.74	33,000	$^{Tot}Soil_{Comb}$
Lead	500	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	15	NE	500	$^{Tot}Soil_{Comb}$
Mercury	3.6	$^{Tot}Soil_{Comb}$	4.6	$^{Air}Soil_{Inh-v}$	0.04	NE	3.6	$^{Tot}Soil_{Comb}$
Selenium	310	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.3	1.14	310	$^{Tot}Soil_{Comb}$
Silver	97	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	NE	NE	97	$^{Tot}Soil_{Comb}$

Sample ID:	SB001	SB001	SB002	SB002	SB003	SB003	SB005	SB005	SB006	SB006
Depth of sample (ft):	0-2'	5'-7'	0-2'	6'-8'	0-2'	4'-6'	0-2'	6'-8'	0-2'	10'-12'
Date:	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:										
Arsenic	4.09	5.48	5.26	4.53	4.93	9.61	5.65	5.77	4.85	7.56
Barium	107	138	132	65.6	97.2	50.5	119	212	78.5	180
Cadmium	0.242 J	0.228 J	1.03	0.152 J	0.194 J	0.634	0.786	0.247 J	0.535 J	0.348 J
Chromium	12.3	18.7	22.9	13	17.3	8.74	24.4	22.9	16.3	24.3
Lead	26.8	21.5	70.5	10.1	15.1	11.4	65.8	15.1	31.7	25.9
Mercury	0.0168 J	0.0251 J	0.0992	<0.0369	0.0514 J	<0.0337	0.0859 J	<0.0386	0.034 J	0.0225 J
Selenium	<0.600	0.156 J	0.31 J	0.153 J	0.155 J	0.11 J	0.392 J	0.237 J	0.16 J	0.405 J
Silver	0.0459 J	0.0661 J	0.393 J	0.0296 J	0.0931 J	0.023 J	0.346 J	0.0447 J	0.265 J	0.0952 J

Sample ID:	SB007	SB007	SB008	SB008	SB009	SB009	SB010	SB010	SB011	SB011
Depth of sample (ft):	0-2'	4'-6'	0-2'	10'-12'	0-2'	3'-5'	0-2'	4'-6'	0-2'	6'-8'
Date:	11/5/2007	11/5/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/30/2007	10/30/2007	10/29/2007	10/29/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:										
Arsenic	3.48	4.25	3.72	4.95	8.73	7.29	11.5	21	13.5	5.03
Barium	70.1	170	85.3	176	183	80.2	129	44.5	228	130
Cadmium	0.0947 J	0.17 J	0.367 J	0.209 J	2.1	0.126 J	1.2	0.143 J	1.26	0.279 J
Chromium	6.23	14	12.3	19.8	41.2	6.25	48.5	5.04	39.8	18.4
Lead	7.97	10.6	22.4	13.6	115	7.26	112	6.26	122	28.8
Mercury	<0.0313	0.0265 J	0.0257 J	<0.0371	0.0949	0.0249 J	0.109	0.0192 J	0.0962	0.0309 J
Selenium	<0.522	<0.59	<0.573	<0.618	0.256 J	0.78 J	<0.492	1.00	<0.615	0.359 J
Silver	0.0295 J	0.0399 J	0.117 J	0.0449 J	0.823	0.0467 J	0.707	0.0166 J	0.516 J	0.183 J

Notes:
Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River Dated February 2008)
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Exceedences of the $^{Tot}Soil_{Comb}$ PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

TABLE 1c
CH2M Hill Phase II ESA (Dallas Floodway, Upper Trinity River) Dated 2008 Analytical
Floodway Areas Only
Metals
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Texas-Specific Background Concentration	Site Specific Background Concentration	Critical PCLs	
Depth of sample (ft): Date:	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway			Critical PCLs	Pathway
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:								
Arsenic	24	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	5.9	13.28	24	$^{Tot}Soil_{Comb}$
Barium	8,100	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	300	275.86	8,100	$^{Tot}Soil_{Comb}$
Cadmium	52	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	NE	NE	52	$^{Tot}Soil_{Comb}$
Chromium	33,000	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	30	39.74	33,000	$^{Tot}Soil_{Comb}$
Lead	500	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	15	NE	500	$^{Tot}Soil_{Comb}$
Mercury	3.6	$^{Tot}Soil_{Comb}$	4.6	$^{Air}Soil_{Inh-v}$	0.04	NE	3.6	$^{Tot}Soil_{Comb}$
Selenium	310	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.3	1.14	310	$^{Tot}Soil_{Comb}$
Silver	97	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	NE	NE	97	$^{Tot}Soil_{Comb}$

Sample ID:	SB012	SB012	SB013	SB012	SB014	SB014	SB015	SB015	SB016	SB016	SB016	SB018	SB018 FD	SB018	SB020	SB020	SB021	SB021	SB023	SB024
Depth of sample (ft):	0-2'	10'-12'	0-2'	13'-15'	5'-7'	13'-15'	0-2'	3'-5'	0-2'	2'-4'	6'-8'	0-2'	0-2'	4'-6'	0-2'	13'-15'	0-2'	4'-6'	0-2'	0-2'
Date:	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	11/2/2007	11/2/2007	11/2/2007	10/30/2007	10/30/2007	11/2/2007	11/2/2007	10/30/2007	10/30/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:																				
Arsenic	7.3	9.72	6.48	6.54	10.1	9.15	15.9	14.5	7.05	6.03	9.38	6.89	5.95	6.3	9.84	5.3	6.67	5.29	18.3	7.19
Barium	149	208	145	348	123	50.6	67.6	66.5	166	313	194	84.8	126	123	59.6	135	147	117	51.3	295
Cadmium	0.564 J	0.216 J	1.17	0.241 J	0.234	0.264	0.139 J	0.189 J	1.39	2.72	0.403 J	1.06	<0.311	<0.245	0.206 J	0.182 J	<0.339	0.414 J	0.199 J	0.392 J
Chromium	31.6	28.5	48.6	23.9	18.2	25.1	10.2	9.43	28.8	21.5	19.8	38.7	21.2	28.5	8.4	17.2	19.8	18.2	6.49	7.04
Lead	107	17.2	116	17.2	11.9	14.8	14	12.4	210	177	33.5	57.9	20.4	14.6	14.6	17.2	19.5	22.3	6.85	57.8
Mercury	0.0363 J	<0.0379	0.12	<0.0369	<0.0365	<0.0371	<0.0344	0.0517 J	0.205	0.16	0.0197 J	0.0431	0.0504	<0.0389	0.0382 J	0.0668 J	0.0507	0.0584	0.0265 J	0.0739
Selenium	0.563 J	<0.631	<0.603	0.426 J	<0.485	<0.376	<0.686	1.62	<0.596	<0.551	<0.455	<0.375	<0.462	<0.398	<0.525	<0.400	<0.484	<0.280	1.00	<0.577
Silver	0.442 J	0.0624 J	0.607 J	0.0358 J	0.0365 J	0.0385 J	0.0321 J	0.0319 J	0.366 J	0.275 J	0.0583 J	0.333 J	0.109 J	0.0733 J	0.0408 J	0.0787 J	0.0993 J	0.238 J	0.0315 J	0.0611 J

Notes:
Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River Dated February 2008)
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Exceedences of the $^{Tot}Soil_{Comb}$ PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

TABLE 1c
CH2M Hill Phase II ESA (Dallas Floodway, Upper Trinity River) Dated 2008 Analytical
Floodway Areas Only
Metals
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Texas-Specific Background Concentration	Site Specific Background Concentration	Critical PCLs	
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway			Critical PCLs	Pathway
Date:								
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:								
Arsenic	24	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	5.9	13.28	24	$^{Tot}Soil_{Comb}$
Barium	8,100	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	300	275.86	8,100	$^{Tot}Soil_{Comb}$
Cadmium	52	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	NE	NE	52	$^{Tot}Soil_{Comb}$
Chromium	33,000	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	30	39.74	33,000	$^{Tot}Soil_{Comb}$
Lead	500	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	15	NE	500	$^{Tot}Soil_{Comb}$
Mercury	3.6	$^{Tot}Soil_{Comb}$	4.6	$^{Air}Soil_{Inh-v}$	0.04	NE	3.6	$^{Tot}Soil_{Comb}$
Selenium	310	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.3	1.14	310	$^{Tot}Soil_{Comb}$
Silver	97	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	NE	NE	97	$^{Tot}Soil_{Comb}$

Sample ID:	SB024	SB026	SB026	SB027	SB027	SB028	SB028	SB029	SB029	SB030
Depth of sample (ft):	13'-15'	0-2'	4'-6'	0-2'	13'-15'	0-2'	4'-6'	0-2'	9'-11	0-2'
Date:	10/30/2007	11/2/2007	11/2/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007	11/5/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:										
Arsenic	5.4	11.2	4.19	8.34	8.08	8.19	9.83	5.28	6.25	6.94
Barium	182	43.3	147	200	184	46.8	91.1 J	163	71.4	162
Cadmium	0.213 J	<0.146	<0.188	0.939	1.14	0.233 J	0.212 J	0.213 J	0.220 J	0.396 J
Chromium	17.9	6.64	12.8	27	45.4	9.87	19.8	28.1	17.1	28.4
Lead	19.1	6.12	10.7	43.9	103	17.2	24.4	15.2	27.5	42.8
Mercury	0.0238 J	0.0404	0.0644	0.072	0.11	0.043	<0.0539	<0.0378	0.042	0.0656
Selenium	<0.645	<0.572	<0.603	<0.610	<0.693	<2.94	<0.605	<0.631	<0.610	<0.627
Silver	0.049 J	0.0245 J	0.0334 J	0.267 J	0.696	<0.0300	0.0351 J	<0.0533	<0.0600	0.128 J

Sample ID:	SB030	SB031	SB031	SB033	SB033	SB034	SB034	SB034 FD	SB035	SB035
Depth of sample (ft):	4'-6'	0-2'	4'-6'	0-2'	3'-5'	0-2'	4'-6'	4'-6'	0-2'	3'-5'
Date:	11/5/2007	11/2/2007	11/2/2007	10/31/2007	10/31/2007	11/5/2007	11/5/2007	11/5/2007	10/30/2007	10/30/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:										
Arsenic	4.72	5.71	18.8	3.46	6.51	5.71	4.2	5.55	6.86	9.49
Barium	168	107	179	348	144	172	210	128	99.5	162
Cadmium	0.350 J	0.862	6.49	0.481 J	0.271 J	0.394 J	0.23 J	1.06	0.314 J	1.06
Chromium	25.3	21.5	102	10.6	26.2	21.9	21	20.9	15.6	35.8
Lead	33	45	**531**	123	23.9	43.1	14.5	14.7	23.9	144
Mercury	0.0273 J	0.105	0.377	0.118	0.037 J	0.0483	0.0245 J	0.0271	<0.038	0.129
Selenium	<0.639	<0.256	<0.638	<0.559	<0.643	<0.603	<0.595	0.118	<0.634	<0.478
Silver	0.107 J	0.324 J	1.79	0.164 J	<0.051	0.184 J	0.0492 J	0.0458 J	0.123 J	0.724

Notes:
Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River Dated February 2008)
mg/kg - milligrams per kilogram
NE - Not Established
NA - Not Analyzed
J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
Exceedences of the $^{Tot}Soil_{Comb}$ PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

TABLE 1c
CH2M Hill Phase II ESA (Dallas Floodway, Upper Trinity River) Dated 2008 Analytical
Floodway Areas Only
Metals
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Texas-Specific Background Concentration	Site Specific Background Concentration	Critical PCLs	
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway			Critical PCLs	Pathway
Date:								
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:								
Arsenic	24	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	5.9	13.28	24	$^{Tot}Soil_{Comb}$
Barium	8,100	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	300	275.86	8,100	$^{Tot}Soil_{Comb}$
Cadmium	52	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	NE	NE	52	$^{Tot}Soil_{Comb}$
Chromium	33,000	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	30	39.74	33,000	$^{Tot}Soil_{Comb}$
Lead	500	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	15	NE	500	$^{Tot}Soil_{Comb}$
Mercury	3.6	$^{Tot}Soil_{Comb}$	4.6	$^{Air}Soil_{Inh-v}$	0.04	NE	3.6	$^{Tot}Soil_{Comb}$
Selenium	310	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.3	1.14	310	$^{Tot}Soil_{Comb}$
Silver	97	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	NE	NE	97	$^{Tot}Soil_{Comb}$

Sample ID:	SB038	SB038	SB039	SB039	SB041	SB041	SB042	SB042	SB043	SB043
Depth of sample (ft):	0-2'	3'-5'	0-2'	4'-6'	0-2'	13'-15'	0-2'	4'-6'	0-2'	13'-15'
Date:	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/30/2007	10/30/2007	10/31/2007	10/31/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:										
Arsenic	5.27	5.27	6.07	7.54	4.93	5.74	6.71	6.21	6.18	5.6
Barium	125	136	126	161	87.1	143	123	190	135	84.5
Cadmium	0.51 J	0.344 J	0.573 J	0.328 J	0.564 J	0.274 J	0.429 J	0.211 J	0.489 J	0.233 J
Chromium	19.6	18.7	24.2	25.8	18.5	20.9	24.5	29	27.5	23.9
Lead	45.8	32.9	68.8	25.2	32.5	19.4	54.7	17.5	70.9	13.5
Mercury	0.0489 J	0.0621 J	0.0565 J	0.0606 J	0.0379 J	0.0199 J	0.0953 J	0.374	0.0484	0.0159 J
Selenium	<0.616	0.403 J	<0.608	0.208 J	0.196 J	0.211 J	<0.592	<0.635	0.135 J	<0.606
Silver	0.307 J	0.122 J	0.247 J	0.107 J	0.295 J	0.0849 J	0.239 J	0.0618 J	0.234 J	<0.0288

Sample ID:	SB045	SB045	SB053	SB053	SB054	SB054	SB055	SB055	SB056	SB056
Depth of sample (ft):	0-2'	4'-6'	0-2'	4'-6'	0-2'	4'-6'	0-2'	4'-6'	0-2'	3'-5'
Date:	10/31/2007	10/31/2007	11/2/2007	11/2/2007	11/2/2007	11/2/2007	11/5/2007	11/5/2007	11/1/2007	11/1/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:										
Arsenic	2.83	3.89	6.03	7.73	6.01	6.24	5.27	6.2	6.09	6.66
Barium	92.1 J	108 J	169	250	125	309	157	204	82.2	152
Cadmium	0.106 J	0.217 J	<0.271	<0.281	0.244 J	<0.274	0.274 J	0.387 J	0.311 J	0.310 J
Chromium	11.6	17.1	23.1	23.4	22.2	25	20.2	23.8	8.46	19.4
Lead	7.18	14.7	16.4	21.7	17.1 J	14.4	25.7	34	17.7	18.7
Mercury	<0.0335	<0.0378	<0.0363	<0.0358	<0.0365	<0.0361	0.0334 J	0.0267 J	0.0185 J	0.0288 J
Selenium	<0.558	<0.630	<0.302	<0.514	0.39 J	<0.286	<0.598	<0.689	<0.298	<0.428
Silver	0.0246 J	0.0554 J	0.0643 J	0.0661 J	0.0488 J	0.0539 J	0.122 J	0.0964 J	0.0242 J	0.0737 J

Notes:
Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River Dated February 2008)
mg/kg - milligrams per kilogram
NE - Not Established
NA - Not Analyzed
J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
Exceedences of the $^{Tot}Soil_{Comb}$ PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Texas-Specific Background Concentration	Site Specific Background Concentration	Critical PCLs	
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway			Critical PCLs	Pathway
Date:								
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:								
Arsenic	24	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh\text{-}v}$	5.9	13.28	24	${}^{Tot}Soil_{Comb}$
Barium	8,100	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh\text{-}v}$	300	275.86	8,100	${}^{Tot}Soil_{Comb}$
Cadmium	52	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh\text{-}v}$	NE	NE	52	${}^{Tot}Soil_{Comb}$
Chromium	33,000	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh\text{-}v}$	30	39.74	33,000	${}^{Tot}Soil_{Comb}$
Lead	500	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh\text{-}v}$	15	NE	500	${}^{Tot}Soil_{Comb}$
Mercury	3.6	${}^{Tot}Soil_{Comb}$	4.6	${}^{Air}Soil_{Inh\text{-}v}$	0.04	NE	3.6	${}^{Tot}Soil_{Comb}$
Selenium	310	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh\text{-}v}$	0.3	1.14	310	${}^{Tot}Soil_{Comb}$
Silver	97	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh\text{-}v}$	NE	NE	97	${}^{Tot}Soil_{Comb}$

Sample ID:	SB057	SB057	SB058	SB058	SB059	SB059 FD	SB059	SB060	SB060 FD	SB060
Depth of sample (ft):	0-2'	13'-15'	0-2'	13'-15'	0-2'	0-2'	13'-15'	0-2'	0-2'	13'-15'
Date:	11/1/2007	11/1/2007	11/1/2007	11/1/2007	11/1/2007	11/1/2007	11/1/2007	11/1/2007	11/1/2007	11/1/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:										
Arsenic	6.64	6.37	5.96	4.87	9.63	8.43	6.04	8.21	9.09	6.95
Barium	118	247	133	32.7	200	159	89.9	166	183	140
Cadmium	0.340 J	0.243 J	0.281 J	0.178 J	0.392 J	0.326 J	0.217 J	0.313 J	0.336 J	0.265 J
Chromium	25.2	19.3	22.4	15.2	24.2	27.3	18.7	25.5	27.8	23.2
Lead	21.5	14.4	41.2	10.7	24.5	17.4	12.7	20.5	18	14.5
Mercury	<0.0376	<0.0379	<0.0385	<0.0366	<0.0387	<0.039	<0.0357	<0.0402	<0.0399	<0.0374
Selenium	<0.515	<0.496	<0.641	<0.61	<0.776	<0.446	<0.572	<0.585	<0.574	<0.631
Silver	0.0718 J	0.0594 J	0.0926 J	0.0416 J	0.0841 J	0.0789 J	0.0511 J	0.086 J	0.0797 J	0.0706 J

Sample ID:	SB061	SB061	SB062	SB062	SB063	SB063	SB064	SB064 FD	SB064	SB065
Depth of sample (ft):	0-2'	13'-15'	0-2'	13'-15'	0-2'	3'-5'	0-2'	0-2'	5'-7'	0-2'
Date:	11/1/2007	11/1/2007	11/1/2007	11/1/2007	10/31/2007	10/31/2007	11/2/2007	11/2/2007	11/2/2007	11/2/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:										
Arsenic	10.8	5.69	7.37	7.19	6.07	5.69	9.72	8.86	5.54	4.36
Barium	150	113	177	201	137	96.6	122	142	33.9	56.5
Cadmium	0.791	0.203 J	0.686	0.261 J	0.277 J	0.264 J	1.59	0.656 J	<0.115	<0.235
Chromium	28	19.2	30.2	28.3	26.3	27.1	35.4	27.5	6.93	15.6
Lead	268	12.4	113	15.8	18.8	17	235	190	7.76	25.7
Mercury	<0.0325	<0.0361	0.0200 J	<0.0393	0.0238 J	<0.0379	0.132	0.0733	<0.0348	0.0472
Selenium	0.614 J	<0.267	<0.286	<0.499	<0.629	<0.631	<0.268	<0.358	<0.258	<0.486
Silver	0.154 J	0.0436 J	0.0938 J	0.0642 J	<0.0517	<0.0585	0.658	0.272 J	0.0201 J	0.0507 J

Notes:
Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River Dated February 2008)
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NE - Not Established
NA - Not Analyzed
J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
Exceedences of the ${}^{Tot}Soil_{Comb}$ PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

TABLE 1c
CH2M Hill Phase II ESA (Dallas Floodway, Upper Trinity River) Dated 2008 Analytical
Floodway Areas Only
Metals
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Texas-Specific Background Concentration	Site Specific Background Concentration	Critical PCLs		SB065 FD	SB065	SB066	SB066 FD	SB066
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway			Critical PCLs	Pathway	0-2'	12'-14'	0-2'	0-2'	9'-11'
Date:									11/2/2007	11/2/2007	11/2/2007	11/2/2007	11/2/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:													
Arsenic	24	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	5.9	13.28	24	$^{Tot}Soil_{Comb}$	5.03	19.1	4.37	7.07	20.8
Barium	8,100	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	300	275.86	8,100	$^{Tot}Soil_{Comb}$	221	27.9	39.2	43.2	14.6
Cadmium	52	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	NE	NE	52	$^{Tot}Soil_{Comb}$	<0.139	<0.268	<0.211	0.244 J	<0.150
Chromium	33,000	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	30	39.74	33,000	$^{Tot}Soil_{Comb}$	13.3	9.31	9.81	11.8	17.8
Lead	500	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	15	NE	500	$^{Tot}Soil_{Comb}$	14.3	5.33	27.5	31.6	6.3
Mercury	3.6	$^{Tot}Soil_{Comb}$	4.6	$^{Air}Soil_{Inh-v}$	0.04	NE	3.6	$^{Tot}Soil_{Comb}$	<0.0353	<0.0333	0.0208 J	<0.035	<0.032
Selenium	310	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.3	1.14	310	$^{Tot}Soil_{Comb}$	<0.533	<0.494	0.231 J	0.183 J	0.421 J
Silver	97	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	NE	NE	97	$^{Tot}Soil_{Comb}$	0.0313 J	0.0135 J	0.0466 J	0.0533 J	<0.533

Sample ID:	SB067	SB067 FD	SB067	SB068	SB068 FD	SB068	SB069	SB069	SB070	SB070 FD	SB070	SB071	SB071	SB072	SB072
Depth of sample (ft):	0-2'	0-2'	4'-6'	0-2'	0-2'	13'-15'	0-2'	13'-15'	0-2'	0-2'	4'-6'	0-2'	4'-6'	0-2'	13'-15'
Date:	11/2/2007	11/2/2007	11/2/2007	11/5/2007	11/5/2007	11/5/2007	11/5/2007	11/5/2007	11/2/2007	11/2/2007	11/2/2007	11/5/2007	11/5/2007	11/5/2007	11/5/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:															
Arsenic	4.9	6.7	3.27	6.11	5.57	5.18	7.01	6.2	6.58	6.99	5.61	6.09	5.28	4.34	5.71
Barium	87.1	83.9	57.5	108	113	151	129	168	107	123	107	165	134	187	162
Cadmium	0.727	0.421 J	<0.0977	0.798	0.509 J	0.207 J	0.592 J	0.283 J	0.263 J	0.473 J	0.223 J	0.404 J	0.515 J	0.264 J	0.315 J
Chromium	12.3	14.7	12.9	26.6	22.8	25.6	25.7	26.3	18.7	19.6	22.4	21.9	28.7	17.5	30.6
Lead	78.4	127	8.38	109	47.3	14.2	35.7	17.3	15.7	57.2	14.7	58.7	43.1	20.8	15.2
Mercury	0.0278 J	0.0555	0.0196 J	0.125	0.0755	<0.0185	<0.0421	<0.0172	0.0155 J	0.0985	<0.037	0.216	0.0959	0.0248 J	0.0213 J
Selenium	0.642	0.357 J	0.304 J	<0.616	<0.626	<0.646	<0.646	<0.705	0.325 J	0.686	0.37 J	<0.613	<0.610	<0.590	<0.644
Silver	0.0651 J	0.0777 J	0.0405 J	0.433 J	0.339 J	0.0411 J	0.112 J	0.0445 J	0.0381 J	0.118 J	0.0447 J	0.0858 J	0.407 J	0.148 J	0.0697 J

Notes:
Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River Dated February 2008)
mg/kg - milligrams per kilogram
NE - Not Established
NA - Not Analyzed
J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
Exceedences of the $^{Tot}Soil_{Comb}$ PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

TABLE 1c
CH2M Hill Phase II ESA (Dallas Floodway, Upper Trinity River) Dated 2008 Analytical
Floodway Areas Only
Metals
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Texas-Specific Background Concentration	Site Specific Background Concentration	Critical PCLs		SB073	SB073	SB074	SB074 FD	SB074	SB075	SB075	SB076	SB076	SB077	SB077	SB078	SB078	SB079	SB079	SB080	SB080	SB081	SB081	SB082	SB082 FD	SB082
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway			Critical PCLs	Pathway	0-2'	13'-15'	0-2'	0-2'	13'-15'	0-2'	13'-15'	0-2'	4'-6'	0-2'	4'-6'	0-2'	3'-5'	0-2'	13'-15'	0-2'	13'-15'	0-2'	4'-6'	0-2'	0-2'	13'-15'
Date:									11/5/2007	11/5/2007	11/5/2007	11/5/2007	11/5/2007	11/5/2007	11/5/2007	11/5/2007	11/5/2007	11/5/2007	11/5/2007	11/5/2007	11/5/2007	11/6/2007	11/6/2007	11/6/2007	11/6/2007	11/5/2007	11/5/2007	11/6/2007	11/6/2007	11/6/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:																														
Arsenic	24	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	5.9	13.28	24	${}^{Tot}Soil_{Comb}$	6.8	5.61	6.05	6.9	5.47	5.09	6.81	4.04	6.91	2.13	1.87	3.92	3.76	6.41	5.73	5.1	5.00	4.37	2.09	4.87	4.79	4.58
Barium	8,100	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	300	275.86	8,100	${}^{Tot}Soil_{Comb}$	257	326	104	149	84	103	152	130	109	239	175	99.7	91.7	124	63.2	122	102	73.2	27.9	213	109	188
Cadmium	52	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	NE	NE	52	${}^{Tot}Soil_{Comb}$	0.421 J	0.223 J	0.789	0.803	0.223 J	3.38	0.237 J	0.157 J	0.152 J	0.119 J	0.0915 J	0.354 J	0.411 J	0.304 J	0.183 J	0.215 J	0.207 J	0.408 J	0.07 J	0.141 J	0.149 J	0.196 J
Chromium	33,000	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	30	39.74	33,000	${}^{Tot}Soil_{Comb}$	21.9	27.8	24.7	23.1	22.9	15.9	21.4	12	10.4	12.6	13.5	20.2	19.4	21.9	15.5	25	17.7	15.2	5.91	23.4	23.5	20.8
Lead	500	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	15	NE	500	${}^{Tot}Soil_{Comb}$	63	15.1	95.2	135	13.3	33.3	13.2	9.27	6.14	8.09	9.66	32.3	26.9	15.1	10.5	17.1	11.7	22.9	4.29	14.5	14	14.3
Mercury	3.6	${}^{Tot}Soil_{Comb}$	4.6	${}^{Air}Soil_{Inh-v}$	0.04	NE	3.6	${}^{Tot}Soil_{Comb}$	0.0695	0.0189 J	<0.0627	0.0602	<0.0383	<0.027	<0.0398	<0.0342	0.0154 J	<0.0348	0.0324 J	0.0726	0.0843	<0.0318	<0.0361	0.0244 J	<0.0198	<0.0632	<0.0199	<0.0391	<0.0393	<0.0372
Selenium	310	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	0.3	1.14	310	${}^{Tot}Soil_{Comb}$	<0.623	<0.661	<0.603	<0.624	<0.639	<0.616	<0.664	0.176 J	0.124 J	0.127 J	<0.592	<0.628	<0.616	<0.624	<0.601	<0.642	<0.609	<0.566	<0.554	0.433 J	0.324 J	<0.194
Silver	97	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	NE	NE	97	${}^{Tot}Soil_{Comb}$	0.134 J	0.0496 J	0.252 J	0.176 J	0.0414 J	0.0686 J	0.0436 J	0.0422 J	0.024 J	0.0436 J	0.0617 J	0.123 J	0.201 J	0.065 J	0.0318 J	0.0559 J	0.0506 J	0.138 J	<0.554	0.0478 J	0.0567 J	0.0283 J

Notes:
Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River Dated February 2008)
mg/kg - milligrams per kilogram
NE - Not Established
NA - Not Analyzed
J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
Exceedences of the ${}^{Tot}Soil_{Comb}$ PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

TABLE 1c
CH2M Hill Phase II ESA (Dallas Floodway, Upper Trinity River) Dated 2008 Analytical
Floodway Areas Only
Metals
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Texas-Specific Background Concentration	Site Specific Background Concentration	Critical PCLs	
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway			Critical PCLs	Pathway
Date:								
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:								
Arsenic	24	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	5.9	13.28	24	${}^{Tot}Soil_{Comb}$
Barium	8,100	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	300	275.86	8,100	${}^{Tot}Soil_{Comb}$
Cadmium	52	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	NE	NE	52	${}^{Tot}Soil_{Comb}$
Chromium	33,000	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	30	39.74	33,000	${}^{Tot}Soil_{Comb}$
Lead	500	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	15	NE	500	${}^{Tot}Soil_{Comb}$
Mercury	3.6	${}^{Tot}Soil_{Comb}$	4.6	${}^{Air}Soil_{Inh-v}$	0.04	NE	3.6	${}^{Tot}Soil_{Comb}$
Selenium	310	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	0.3	1.14	310	${}^{Tot}Soil_{Comb}$
Silver	97	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	NE	NE	97	${}^{Tot}Soil_{Comb}$

Sample ID:	SB083	SB083 FD	SB083	SB084	SB084	SB085	SB085	SB086	SB086 FD	SB086	SB087	SB087 FD
Depth of sample (ft):	0-2'	0-2'	13'-15'	0-2'	13'-15'	0-2'	12'-14'	0-2'	0-2'	13'-15'	0-2'	0-2'
Date:	11/6/2007	11/6/2007	11/6/2007	11/6/2007	11/6/2007	11/6/2007	11/6/2007	11/6/2007	11/6/2007	11/6/2007	11/6/2007	11/6/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:												
Arsenic	4.19	3.14	3.51	5.51	5.54	3.89	4.82	4.64	4.61	5.54	4.75	5.56
Barium	168	148	95.9	232	257	238	164	144	164	181	188	153
Cadmium	0.164 J	0.149 J	0.129 J	0.29 J	0.304 J	0.283 J	0.208 J	0.141 J	0.153 J	0.202 J	0.169 J	0.186 J
Chromium	20.8	18.8	23.4	25.9	26.6	29.3	26.9	31.4	29.4	29.1	30.4	31.7
Lead	17.4	12.8	12.9	18.9	17.5	15.5	12.9	14.8	15.3	15.5	21.8	29.2
Mercury	<0.0374	<0.0368	<0.0374	0.0168 J	<0.0377	<0.0401	0.0184 J	<0.0391	<0.0395	<0.0388	<0.0416	<0.0414
Selenium	0.401 J	<0.286	<0.623	0.451 J	<0.296	0.339 J	<0.66	0.255 J	0.297 J	0.401 J	0.345 J	0.338 J
Silver	0.0465 J	0.0482 J	0.0474 J	0.0731 J	0.0518 J	0.074 J	0.0417 J	0.0566 J	0.0554 J	0.0443 J	0.0583 J	0.051 J

Sample ID:	SB087	SB088	SB088 FD	SB088	SB089	SB089	SB090	SB090	SB091	SB091
Depth of sample (ft):	5'-7'	0-2'	0-2'	4'-6'	0-2'	4'-6'	0-2'	13'-15'	0-2'	4'-6'
Date:	11/6/2007	11/6/2007	11/6/2007	11/6/2007	10/31/2007	10/31/2007	10/29/2007	10/29/2007	11/5/2007	11/5/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:										
Arsenic	4.92	5	5.11	4.75	6.28	6.39	5.32	6.05	4.39	6.32
Barium	145	157	149	83.3	155 J	148 J	103	115	170	127
Cadmium	0.184 J	0.241 J	0.248 J	0.149 J	0.478 J	0.325 J	0.476 J	0.153 J	0.375 J	0.187 J
Chromium	32	26.5	25.4	29	24.3	21.8	19.7	27	23.7	22.4
Lead	21.2	36.9	39.3	14.3	46.9 J	50.5 J	32	14.2	15.8	12.7
Mercury	<0.0425	0.026 J	<0.0389	<0.0396	<0.0484	<0.0291	0.0363 J	<0.0372	<0.0305	<0.0296
Selenium	0.403 J	0.322 J	0.426 J	0.312 J	<0.623	<0.160	0.229 J	0.19 J	<0.613	<0.624
Silver	0.0592 J	0.0627 J	0.0628 J	0.0554 J	0.173 J	0.0908 J	0.225 J	0.0521 J	0.09 J	0.0364 J

Notes:
Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River Dated February 2008)
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NE - Not Established
NA - Not Analyzed
J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
Exceedences of the ${}^{Tot}Soil_{Comb}$ PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

TABLE 1c
CH2M Hill Phase II ESA (Dallas Floodway, Upper Trinity River) Dated 2008 Analytical
Floodway Areas Only
Metals
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Texas-Specific Background Concentration	Site Specific Background Concentration	Critical PCLs		SB092	SB092	SB093	SB093 FD	SB093	SB094	SB094
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway			Critical PCLs	Pathway	0-2'	13'-15'	0-2'	0-2'	13'-15'	0-2'	13'-15'
Date:									10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007	10/29/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:															
Arsenic	24	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	5.9	13.28	24	$^{Tot}Soil_{Comb}$	6.57	7.78	5.22	6.41	6.04	5.89	6.01
Barium	8,100	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	300	275.86	8,100	$^{Tot}Soil_{Comb}$	119	81	109	125	151	138	149
Cadmium	52	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	NE	NE	52	$^{Tot}Soil_{Comb}$	0.863	0.259 J	0.496 J	0.937	0.167 J	0.599 J	0.2 J
Chromium	33,000	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	30	39.74	33,000	$^{Tot}Soil_{Comb}$	24.1	24	18.7	23.2	30.4	30	24.2
Lead	500	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	15	NE	500	$^{Tot}Soil_{Comb}$	47.4	13	33.7	51.4	14.4	73.6	12.5
Mercury	3.6	$^{Tot}Soil_{Comb}$	4.6	$^{Air}Soil_{Inh-v}$	0.04	NE	3.6	$^{Tot}Soil_{Comb}$	0.0837	<0.0391	0.0478 J	0.0868	<0.0364	0.0635	<0.0369
Selenium	310	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.3	1.14	310	$^{Tot}Soil_{Comb}$	0.276 J	0.303 J	0.205 J	0.25 J	0.21 J	<0.611	0.329 J
Silver	97	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	NE	NE	97	$^{Tot}Soil_{Comb}$	0.412 J	0.0719 J	0.291 J	0.498 J	0.0647 J	0.305 J	0.0745 J

Notes:
Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River Dated February 2008)
mg/kg - milligrams per kilogram
NE - Not Established
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J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
Exceedences of the $^{Tot}Soil_{Comb}$ PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

TABLE 1d
CH2M Hill Phase II ESA (Dallas Floodway, Upper Trinity River) Dated 2008 Analytical
Floodway Areas Only
Pesticides and PCBs
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Soil PCLs		TRRP Tier 1 Residential Soil PCLs		Critical PCLs		SB006	SB011	SB013	SB015	SB016	SB016	SB024	SB028	SB029	SB030	SB031	SB031	SB033	SB035	SB045	SB056	SB060	SB090	SB091	SB093 FD
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Critical PCLs	Pathway	0-2'	0-2'	0-2'	0-2'	0-2'	2'-4'	0-2'	0-2'	9'-11	4'-6'	0-2'	4'-6'	0-2'	3'-5'	0-2'	3'-5'	0-2'	0-2'	0-2'	0-2'
Date:							10/29/2007	10/29/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/31/2007	10/31/2007	11/5/2007	11/2/2007	11/2/2007	10/31/2007	10/30/2007	10/31/2007	11/1/2007	11/1/2007	10/29/2007	11/5/2007	10/29/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Pesticides:																										
4,4-DDD	14	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	14	$^{Tot}Soil_{Comb}$	ND	<0.0042	<0.0041	<0.0019	<0.0041	<0.0037	<0.0059	<0.002	<0.0021	<0.0022	<0.002	<0.0041	<0.0019	<0.0021	<0.0038	0.015	<0.0023	ND	<0.0042	ND
4,4-DDE	10	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	10	$^{Tot}Soil_{Comb}$	ND	<0.0042	<0.0041	0.0013 J	<0.0041	<0.0037	<0.0059	<0.002	<0.0021	<0.0022	<0.002	<0.0041	<0.0019	<0.0021	<0.0038	<0.0021	<0.0023	ND	<0.0042	ND
4,4-DDT	5.4	$^{Tot}Soil_{Comb}$	1,200	$^{Air}Soil_{Inh-v}$	5.4	$^{Tot}Soil_{Comb}$	ND	<0.0042	0.0032 J	<0.0019	<0.0041	<0.0037	<0.0059	0.0013 J	<0.0021	<0.0022	<0.002	0.022 J	<0.0019	<0.0021	<0.0038	<0.0021	0.0012 J	ND	<0.0042	ND
Alpha-Chlordane	13	$^{Tot}Soil_{Comb}$	4100	$^{Air}Soil_{Inh-v}$	13	$^{Tot}Soil_{Comb}$	ND	<0.0042	<0.0041	<0.0019	<0.0041	<0.0037	<0.0059	<0.002	<0.0021	<0.0022	<0.002	0.0074	<0.0019	<0.0021	<0.0038	<0.0021	<0.0023	ND	<0.0042	ND
Dieldrin	0.15	$^{Tot}Soil_{Comb}$	32	$^{Air}Soil_{Inh-v}$	0.15	$^{Tot}Soil_{Comb}$	ND	0.0052	<0.0041	<0.0019	0.012 J	<0.0037	0.0024 J	<0.002	0.035	0.006 J	0.0018 J	0.018 J	0.0064 J	0.0084 J	0.013 J	<0.0021	<0.0023	ND	0.0061 J	ND
Endosulfan II	270	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	270	$^{Tot}Soil_{Comb}$	ND	<0.0042	<0.0041	<0.0019	<0.0041	<0.0037	<0.0059	<0.002	<0.0021	<0.0022	<0.002	0.013	<0.0019	<0.0021	<0.0038	<0.0021	<0.0023	ND	<0.0042	ND
Endosulfan Sulfate	380	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	380	$^{Tot}Soil_{Comb}$	ND	<0.0042	<0.0041	<0.0019	<0.0041	<0.0037	<0.0059	<0.002	<0.0021	<0.0022	<0.002	0.0013 J	<0.0019	<0.0021	<0.0038	<0.0021	<0.0023	ND	<0.0042	ND
Endrin	9	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	9	$^{Tot}Soil_{Comb}$	ND	<0.0042	<0.0041	<0.0019	<0.0041	<0.0037	<0.0059	<0.002	<0.0021	<0.0022	<0.002	0.0043 J	<0.0019	<0.0021	<0.0038	<0.0021	<0.0023	ND	<0.0042	ND
Endrin Aldehyde	19	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	19	$^{Tot}Soil_{Comb}$	ND	<0.0042	<0.0041	<0.0019	<0.0041	<0.0037	<0.0059	<0.002	<0.0021	<0.0022	<0.002	0.013 J	<0.0019	<0.0021	<0.0038	<0.0021	<0.0023	ND	<0.0042	ND
Gamma-BHC (Lindane)	1.1	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	1.1	$^{Tot}Soil_{Comb}$	ND	<0.0042	<0.0041	<0.0019	0.0032 J	0.004	<0.0059	<0.002	<0.0021	<0.0022	<0.002	0.0021	0.00048 J	0.0024 J	0.0029 J	<0.0021	<0.0023	ND	<0.0042	ND
Gamma-Chlordane	7.4	$^{Tot}Soil_{Comb}$	970	$^{Air}Soil_{Inh-v}$	7.4	$^{Tot}Soil_{Comb}$	ND	<0.0042	<0.0041	<0.0019	<0.0041	<0.0037	<0.0059	<0.002	<0.0021	<0.0022	<0.002	0.0091	<0.0019	<0.0021	<0.0038	<0.0021	<0.0023	ND	<0.0042	ND
Methoxychlor	270	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	270	$^{Tot}Soil_{Comb}$	ND	0.0031 J	<0.0041	0.0034 J	0.017 J	0.018 J	0.010 J	<0.002	0.018 J	<0.0022	<0.002	0.026	0.0041	0.015 J	0.013	0.012	<0.0023	ND	<0.0042	ND
PCBs:																										
Aroclor-1254	1.1	$^{Tot}Soil_{Comb}$	54	$^{Air}Soil_{Inh-v}$	1.1	$^{Tot}Soil_{Comb}$	0.013 J	0.032 J	0.050	ND	ND	ND	ND	<0.039	ND	ND	ND	<0.039	ND	ND	ND	ND	ND	0.007 J	ND	0.013 J
Aroclor-1260	1.1	$^{Tot}Soil_{Comb}$	54	$^{Air}Soil_{Inh-v}$	1.1	$^{Tot}Soil_{Comb}$	<0.039	<0.041	<0.040	ND	ND	ND	ND	0.037 J	ND	ND	ND	0.31	ND	ND	ND	ND	ND	<0.039	ND	<0.041

Notes:
Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River Dated February 2008)
mg/kg - milligrams per kilogram
NE - Not Established
NA - Not Analyzed
ND - Analyte was not detected above SDL and was not included in provided spreadsheets
J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
Exceedences of the $^{Tot}Soil_{Comb}$ PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

Table 2a
CH2M Hill Phase II ESA (Dallas Floodway, Upper Trinity River) Dated 2008 Analytical
Borrow Areas Only
SVOC
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Ecological Benchmarks	Critical PCLs		SB017	SB017	SB019	SB019	SB019 FD	SB022	SB022 FD	SB022	SB025	SB025	SB032	SB032	SB036	SB036	SB044	SB044
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Soil	Critical PCLs	Pathway	0-2'	13'-15'	0-2'	12'-14'	12'-14'	0-2'	0-2'	13'-15'	0-2'	13'-15'	0-2'	13'-15'	0-2'	13'-15'	0-2'	13'-15'
Date:								10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SVOCs/PAHs:																							
Benzo(b)fluoranthene	5.7	^{Tot}Soil $_{Comb}$	6,100	^{Air}Soil $_{Inh-v}$	59.8*	5.7	^{Tot}Soil $_{Comb}$	<0.0260	<0.0330	<0.0290	<0.0320	<0.0340	<0.0280	<0.0270	<0.0280	<0.0280	<0.0300	<0.0270	<0.0290	<0.0300	<0.0310	<0.0270	<0.0300
Benzo(g,h,i)perylene	1,800	^{Tot}Soil $_{Comb}$	NE	^{Air}Soil $_{Inh-v}$	119*	119	Eco	<0.0310	<0.0390	0.0450 J	<0.0370	<0.0410	<0.0330	<0.0320	<0.0330	<0.0330	<0.0350	<0.0320	<0.0350	<0.0350	<0.0360	<0.0330	<0.0350
Bis(2-Ethylhexyl) Phthalate	43	^{Tot}Soil $_{Comb}$	NE	^{Air}Soil $_{Inh-v}$	0.925*	0.925	Eco	<0.0420	<0.0520	<0.0460	<0.0500	<0.0550	<0.0440	<0.0430	<0.0450	<0.0450	<0.0470	0.0590 J	<0.0470	<0.0480	<0.0490	<0.0440	<0.0470
Diethyl phthalate	53,000	^{Tot}Soil $_{Comb}$	NE	^{Air}Soil $_{Inh-v}$	100	100	Eco	<0.0240	<0.0300	<0.0260	<0.0290	<0.0310	0.0360 J	0.0370 J	0.0270 J	0.0330 J	0.0360 J	<0.0250	<0.0260	<0.0270	<0.0280	<0.0250	<0.0270
Fluoranthene	2,300	^{Tot}Soil $_{Comb}$	NE	^{Air}Soil $_{Inh-v}$	122*	122	Eco	<0.0590	<0.0720	<0.0640	<0.0700	<0.0760	<0.0610	<0.0590	<0.0630	<0.0620	<0.0660	0.0740 J	<0.0650	<0.0660	<0.0680	0.0840 J	<0.0650
Naphthalene	220	^{Tot}Soil $_{Comb}$	270	^{Air}Soil $_{Inh-v}$	0.0994*	0.0994*	Eco	<0.0230	<0.0280	<0.0250	<0.0270	<0.0290	<0.0240	<0.0230	<0.0240	<0.0240	<0.0250	<0.0230	<0.0250	<0.0250	<0.0260	<0.0230	<0.0250
Phenanthrene	1,700	^{Tot}Soil $_{Comb}$	NE	^{Air}Soil $_{Inh-v}$	45.7*	45.7	Eco	<0.0190	<0.0240	<0.0210	<0.0230	<0.0250	<0.0200	<0.0200	<0.0210	<0.0210	<0.0220	0.0380 J	<0.0210	<0.0220	<0.0230	0.0570 J	<0.0220
Pyrene	1,700	^{Tot}Soil $_{Comb}$	NE	^{Air}Soil $_{Inh-v}$	78.5*	78.5	Eco	<0.0430	<0.0530	<0.0470	<0.0510	<0.0560	<0.0450	<0.0440	<0.0460	<0.0460	<0.0480	0.0610 J	<0.0470	<0.0480	<0.0500	0.0630 J	<0.0480

Notes:

Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River Dated February 2008

mg/kg - milligrams per kilogram
NE - Not Established
NA - Not Analyzed
J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
*TRRP Benchmark not available. Benchmark from EPA Region 5 Ecological Screening Levels (ESLs)
for soil http://rais.ornl.gov/tools/eco_search.php
Exceedences of the Critical PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

TABLE 2b
CH2M Hill Phase II ESA (Dallas Floodway, Upper Trinity River) Dated 2008 Analytical
Borrow Areas Only
VOCs
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Ecological Benchmarks	Critical PCLs		SB017	SB017	SB019	SB019	SB019 FD	SB022	SB022 FD	SB022	SB025	SB025	SB032	SB032	SB036	SB036	SB044	SB044
Depth of sample:	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Soil	Critical PCLs	Pathway	0-2'	13'-15'	0-2'	12'-14'	12'-14'	0-2'	0-2'	13'-15'	0-2'	13'-15'	0-2'	13'-15'	0-2'	13'-15'	0-2'	13'-15'
Date:								10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VOCs:																							
Acetone	66,000	$^{Tot}Soil_{Comb}$	600,000	$^{Air}Soil_{Inh-v}$	2.5*	2.5*	Eco	<0.00470	0.0440 J	<0.00360	0.072 J	0.0850 J	<0.00390	<0.00390	<0.00660	<0.00480	0.0850	<0.00550	0.0230 J	<0.00540	0.0250 J	<0.00340	<0.00360
2-Butanone	40,000	$^{Tot}Soil_{Comb}$	200,000	$^{Air}Soil_{Inh-v}$	89.6*	25.71	Eco	<0.00120	<0.00130	<0.000940	0.015	<0.00170	<0.00100	<0.00100	<0.00170	<0.00130	0.00640 J	<0.00140	<0.00150	<0.00140	<0.00150	<0.000890	<0.000930
Freon-113	NE	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	NE	NE	Eco	<0.000980	<0.00100	<0.000750	<0.000810	<0.00130	<0.000800	<0.000800	0.00370 J	<0.00100	<0.000860	<0.00110	<0.00120	<0.00110	<0.00120	<0.000710	<0.000750
Methylene Chloride	480	$^{Tot}Soil_{Comb}$	13,000	$^{Air}Soil_{Inh-v}$	4.05*	4.05*	Eco	<0.00120	<0.00130	<0.000950	<0.00100	<0.00170	<0.00100	<0.00100	0.0230	<0.00130	<0.00110	<0.00140	<0.00150	<0.00140	<0.00150	<0.000900	<0.000940
Naphthalene	220	$^{Tot}Soil_{Comb}$	270	$^{Air}Soil_{Inh-v}$	0.0994*	0.0994*	Eco	(PAH)	(PAH)	(PAH)	(PAH)	(PAH)	(PAH)	(PAH)	(PAH)	(PAH)	(PAH)	(PAH)	(PAH)	(PAH)	(PAH)	(PAH)	(PAH)

Notes:

Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River Dated February 2008

mg/kg - milligrams per kilogram

NE - Not Established

NA - Not Analyzed

J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.

*TRRP Benchmark not available. Benchmark from EPA Region 5 Ecological Screening Levels (ESLs) for soil
http://rais.ornl.gov/tools/eco_search.php

Exceedences of the Critical PCL are in **BOLD** text and highlighted in Orange

The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

TABLE 2c
CH2M Hill Phase II ESA (Dallas Floodway, Upper Trinity River) Dated 2008 Analytical
Borrow Areas Only
Metals
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Ecological Benchmarks	Texas-Specific Background Concentration	Site Specific Background Concentration	Critical PCLs	
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Soil			Critical PCLs	Pathway
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:									
Arsenic	24	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	18	5.9	13.28	18	Eco
Barium	8,100	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	330	300	275.86	330	Eco
Cadmium	52	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	32	NE	NE	32	Eco
Chromium	33,000	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	0.4	30	39.74	39.74	SSBC
Lead	500	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	120	15	NE	120	Eco
Mercury	3.6	${}^{Tot}Soil_{Comb}$	4.6	${}^{Air}Soil_{Inh-v}$	0.1	0.04	NE	0.1	Eco
Selenium	310	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	1.0	0.3	1.14	1.14	SSBC
Silver	97	${}^{Tot}Soil_{Comb}$	NE	${}^{Air}Soil_{Inh-v}$	2.0	NE	NE	2.0	Eco

Sample ID:	SB017	SB017	SB019	SB019	SB019 FD	SB022	SB022 FD	SB022	SB025	SB025	SB032	SB032	SB036	SB036	SB044	SB044
Depth of sample (ft):	0-2'	13'-15'	0-2'	12'-14'	12'-14'	0-2'	0-2'	13'-15'	0-2'	13'-15'	0-2'	13'-15'	0-2'	13'-15'	0-2'	13'-15'
Date:	10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:																
Arsenic	7.61	8.06	6.16	8.68	7.29	5.27	6.73	5.16	5.80	3.61	**18.4**	4.72	5.95	5.52	5.81	3.10
Barium	33.2	194	172	163	178	124	178	197	122	88.5	**522**	95.4	159	115	143	264
Cadmium	0.138 J	0.294 J	0.287 J	0.488 J	0.448 J	0.554 J	0.275 J	0.203 J	0.517 J	0.190 J	0.410 J	0.187 J	0.278 J	0.203 J	0.912	0.221 J
Chromium	9.23	27.0	27.1	25.0	34.7	18.8	19.1	23.8	18.8	11.4	**41.4**	15.8	28.6	31.3	27.5	32.4
Lead	6.93	25.9	19.7	82.1	41.2	37.8	24.1	16.4	40.3	13.6	11.6	14.1	20.0	16.1	108	16.1
Mercury	<0.0138	0.0680	<0.0152	0.0420	0.0688	0.0495	0.0158 J	0.0148 J	0.0902	<0.0155	0.0438	<0.0153	0.0303 J	<0.0160	0.0649	0.0159 J
Selenium	<0.109	<0.135	<0.0120	<0.130	0.182 J	<0.115	<0.0111	<0.0117	<0.116	<0.123	<0.112	<0.120	<0.123	0.314 J	<0.114	<0.122
Silver	0.0148 J	0.126 J	0.0692 J	0.117 J	0.148 J	0.193 J	0.0847 J	0.0306 J	0.186 J	0.0488 J	0.205 J	0.0416 J	0.0809 J	0.0590 J	0.314J	0.0460 J

Notes:
Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River Dated February 2008
mg/kg - milligrams per
kilogram
NE - Not Established
NA - Not Analyzed
J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
If the concentration of a COC in soil is at or below the median Texas-Specific Background Concentration, the benchmark value may be ignored.
*TRRP Benchmark not available. Benchmark from EPA Region 5 Ecological Screening
Levels (ESLs) for soil http://rais.ornl.gov/tools/eco_search.php
Exceedences of the Critical PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and
based upon a MSD certification for the Dallas Floodway

TABLE 2d
CH2M Hill Phase II ESA (Dallas Floodway, Upper Trinity River) Dated 2008 Analytical
Borrow Areas Only
Pesticides and PCBs
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Ecological Benchmarks	Critical PCLs		SB017	SB017	SB019	SB019	SB019 FD	SB022	SB022 FD	SB022	SB025	SB025	SB032	SB032	SB036	SB036	SB044	SB044
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Soil	Critical PCLs	Pathway	0-2'	13'-15'	0-2'	12'-14'	12'-14'	0-2'	0-2'	13'-15'	0-2'	13'-15'	0-2'	13'-15'	0-2'	13'-15'	0-2'	13'-15'
Date:								10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/30/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007	10/31/2007
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Pesticides:																							
4,4-DDD	14	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.00332*	0.00332*	Eco	<0.00130	<0.000830	<0.000740	<0.000800	<0.000880	<0.000710	<0.000680	<0.000720	<0.00140	<0.000760	<0.00210	<0.000740	<0.000760	<0.000780	<0.000700	<0.000750
4,4-DDE	10	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.758*	0.758*	Eco	<0.000810	<0.000500	<0.000450	<0.000490	<0.000530	<0.000430	<0.000410	<0.000440	<0.000870	<0.000460	<0.00130	<0.000450	<0.000460	<0.000470	<0.000420	<0.000450
4,4-DDT	5.4	$^{Tot}Soil_{Comb}$	1,200	$^{Air}Soil_{Inh-v}$	0.596*	0.596*	Eco	<0.00100	<0.000620	<0.000550	<0.000590	<0.000650	<0.000520	<0.000510	<0.000530	<0.00110	<0.000560	<0.00150	<0.000550	<0.000560	<0.000580	<0.000520	<0.000560
Aldrin	0.05	$^{Tot}Soil_{Comb}$	8.3	$^{Air}Soil_{Inh-v}$	0.0035*	0.0035*	Eco	<0.000890	<0.000550	<0.000490	<0.000530	<0.000580	<0.000470	<0.000450	<0.000480	<0.000950	<0.000500	<0.00140	<0.000490	<0.000510	<0.000520	<0.000460	<0.000500
Endosulfan Sulfate	380	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.0358*	0.0358*	Eco	<0.000570	<0.000350	<0.000310	<0.000340	<0.000370	<0.000300	<0.000290	<0.000300	<0.000610	<0.000320	<0.000880	<0.000310	<0.000320	<0.000330	<0.000300	<0.000320
PCBs:																							
Aroclor-1254	1.1	$^{Tot}Soil_{Comb}$	54	$^{Air}Soil_{Inh-v}$	40	1.1	$^{Tot}Soil_{Comb}$	<0.00410	<0.00510	<0.00450	<0.00490	<0.00540	<0.00430	<0.00420	<0.00440	<0.00440	<0.00460	0.0290 J	<0.00450	<0.00460	<0.00480	<0.00430	<0.00460
Aroclor-1260	1.1	$^{Tot}Soil_{Comb}$	54	$^{Air}Soil_{Inh-v}$	40	1.1	$^{Tot}Soil_{Comb}$	<0.0100	<0.0130	<0.0110	<0.0120	<0.0130	<0.0110	<0.0100	<0.0110	<0.0110	<0.0110	<0.0100	<0.0110	<0.0120	<0.0120	<0.0110	<0.0110

Notes:
Analytical results from CH2M Hill Phase II Environmental Site Assessment (Dallas Floodway, Upper Trinity River Dated February
mg/kg - milligrams per kilogram
NE - Not Established
NA - Not Analyzed
J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
*TRRP Benchmark not available. Benchmark from EPA Region 5 Ecological Screening Levels (ESLs)
for soil http://rais.ornl.gov/tools/eco_search.php
Exceedences of the Critical PCL are in **BOLD** text and highlighted in Orange

The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

Table 3a
HVJ Phase II ESA (Trinity River Bridges and Utilities Project) Dated 2007 Analytical
Borrow Areas Only
SVOC
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Ecological Benchmarks	Critical PCLs		EB 01 (0-4)	EB 01 (4-8)	EB 02 (0-4)	EB 02 (4-8)	EB 03 (0-4)	EB 03 (4-8)	EB 04 (0-4)	EB 04 (4-8)
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Soil	Critical PCLs	Pathway	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'
Date:								10/10/2008	10/10/2008	10/10/2008	10/10/2008	10/10/2008	10/10/2008	10/9/2008	10/9/2008
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SVOCs/PAHs:															
Benzo(b)fluoranthene	5.7	$^{Tot}Soil_{Comb}$	6,100	$^{Air}Soil_{Inh-v}$	59.8*	5.7	$^{Tot}Soil_{Comb}$	<0.0400	<0.0400	<0.0410	<0.0410	<0.0390	<0.0410	<0.0400	<0.0400
Benzo(g,h,i)perylene	1,800	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	119*	119*	Eco	<0.0400	<0.0400	<0.0410	<0.0410	<0.0390	<0.0410	<0.0400	<0.0400
Bis(2-Ethylhexyl) Phthalate	43	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.925*	0.925*	Eco	NA	NA	NA	NA	NA	NA	NA	NA
Diethyl phthalate	53,000	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	100	100	Eco	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	2,300	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	122*	122*	Eco	<0.0440	<0.0440	<0.0450	<0.0450	<0.0430	<0.0450	<0.0440	<0.0450
Naphthalene	220	$^{Tot}Soil_{Comb}$	270	$^{Air}Soil_{Inh-v}$	0.0994*	0.0994*	Eco	<0.0420	<0.0430	<0.0430	<0.0440	<0.0420	<0.0430	<0.0430	<0.0430
Phenanthrene	1,700	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	45.7*	45.7*	Eco	<0.0400	<0.0400	<0.0410	<0.0410	<0.0390	<0.0410	<0.0400	<0.0400
Pyrene	1,700	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	78.5*	78.5*	Eco	<0.0450	<0.0450	<0.0460	<0.0470	<0.0450	<0.0460	<0.0460	<0.0460

Sample ID:	EB 05 (0-4)	EB 05 (4-8)	EB 06 (0-4)	EB 06 (4-8)	EB 07 (0-4)	EB 07 (4-8)	EB 08 (0-4)	EB 08 (4-8)	EB 10 (0-4)	EB 10 (4-8)
Depth of sample (ft):	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'
Date:	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SVOCs/PAHs:										
Benzo(b)fluoranthene	<0.0400	<0.0420	<0.0410	<0.0420	<0.0410	<0.0420	<0.0400	<0.0400	<0.0410	<0.0410
Benzo(g,h,i)perylene	<0.0400	<0.0420	<0.0410	<0.0420	<0.0410	<0.0420	<0.0400	<0.0400	<0.0410	<0.0410
Bis(2-Ethylhexyl) Phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	<0.0440	<0.0460	<0.0450	<0.0470	<0.0450	<0.0460	<0.0440	<0.0440	<0.0450	<0.0450
Naphthalene	<0.0430	<0.0440	<0.0430	<0.0450	<0.0440	<0.0440	<0.0430	<0.0420	<0.0430	<0.0440
Phenanthrene	<0.0400	<0.0420	<0.0410	<0.0420	<0.0410	<0.0420	<0.0400	<0.0400	<0.0410	<0.0410
Pyrene	<0.0460	<0.0470	<0.0460	<0.0480	<0.0470	<0.0470	<0.0460	<0.0450	<0.0460	<0.0470

Notes:
Analytical Results from HVJ Phase II ESA Trinity River Bridges and Utilities Project prepared for URS, title page dated Nov 2007,
Cover letter dated Nov 2008
mg/kg - milligrams per kilogram
NE - Not Established
NA - Not Analyzed
J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
*TRRP Benchmark not available. Benchmark from EPA Region 5 Ecological Screening Levels (ESLs) for soil
http://rais.ornl.gov/tools/eco_search.php
Exceedences of the Critical PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

Table 3a
HVJ Phase II ESA (Trinity River Bridges and Utilities Project) Dated 2007 Analytical
Borrow Areas Only
SVOC
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Ecological Benchmarks	Critical PCLs		EB 11 (0-4)	EB 11 (4-8)	EB 12 (0-4)	EB 12 (4-8)	EB 13 (0-4)	EB 13 (4-6)	EB 15 (0-4)	EB 15 (4-6)	EB 16 (0-4)	EB 16 (4-8)	EB 20 (0-4)	EB 20 (4-8)	EB 22 (0-4)	EB 22 (4-8)	EB 23 (0-4)	EB 23 (4-8)	EB 24 (0-4)	EB 24 (4-8)
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Soil	Critical PCLs	Pathway	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-6'	0-4'	4'-6'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'
Date:								10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SVOCs/PAHs:																									
Benzo(b)fluoranthene	5.7	$^{Tot}Soil_{Comb}$	6,100	$^{Air}Soil_{Inh-v}$	59.8*	5.7	$^{Tot}Soil_{Comb}$	<0.0400	<0.0410	<0.0400	<0.0410	<0.0400	<0.0400	<0.0370	<0.0380	<0.0340	<0.0370	<0.0370	<0.0410	<0.0380	<0.0400	0.044 J	<0.0390	<0.0400	<0.0370
Benzo(g,h,i)perylene	1,800	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	119*	119*	Eco	<0.0400	<0.0410	<0.0400	<0.0410	<0.0400	<0.0400	<0.0370	<0.0380	<0.0340	<0.0370	<0.0370	<0.0410	<0.0380	<0.0400	<0.0360	<0.0390	<0.0400	<0.0370
Bis(2-Ethylhexyl) Phthalate	43	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.925*	0.925*	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethyl phthalate	53,000	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	100	100	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	2,300	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	122*	122*	Eco	<0.0440	<0.0450	<0.0440	<0.0450	<0.0440	<0.0440	<0.0410	<0.0420	<0.0370	<0.0410	<0.0410	<0.0450	<0.0420	<0.0440	0.049 J	<0.0430	<0.0440	<0.0410
Naphthalene	220	$^{Tot}Soil_{Comb}$	270	$^{Air}Soil_{Inh-v}$	0.0994*	0.0994*	Eco	<0.0420	<0.0430	<0.0430	<0.0430	<0.0430	<0.0430	<0.0400	<0.0410	<0.0360	<0.0400	<0.0400	<0.0440	<0.0400	<0.0430	<0.0390	<0.0420	<0.0430	<0.0390
Phenanthrene	1,700	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	45.7*	45.7*	Eco	<0.0400	<0.0410	<0.0400	<0.0410	<0.0400	<0.0400	<0.0370	<0.0380	<0.0340	<0.0370	<0.0370	<0.0410	<0.0380	<0.0400	<0.0360	<0.0390	<0.0400	<0.0370
Pyrene	1,700	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	78.5*	78.5*	Eco	<0.0450	<0.0460	<0.0460	<0.0460	<0.0460	<0.0460	<0.0420	<0.0440	<0.0380	<0.0430	<0.0420	<0.0470	<0.0430	<0.0460	0.042 J	<0.0450	<0.0450	<0.0420

Notes:
Analytical Results from HVJ Phase II ESA Trinity River Bridges and Utilities Project prepared for URS, title page dated Nov 2007, Cover letter dated Nov 2008
mg/kg - milligrams per kilogram
NE - Not Established
NA - Not Analyzed
J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
*TRRP Benchmark not available. Benchmark from EPA Region 5 Ecological Screening Levels (ESLs) for soil
http://rais.ornl.gov/tools/eco_search.php
Exceedences of the Critical PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 anc upon a MSD certification for the Dallas Floodway

Table 3a
HVJ Phase II ESA (Trinity River Bridges and Utilities Project) Dated 2007 Analytical
Borrow Areas Only
SVOC
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Ecological Benchmarks	Critical PCLs		EB 25 (0-4)	EB 25 (4-8)	EB 26 (0-4)	EB 26 (4-8)	EB 28 (0-4)	EB 28 (4-8)	EB 29 (0-4)	EB 29 (4-8)
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Soil	Critical PCLs	Pathway	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'
Date:								10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SVOCs/PAHs:															
Benzo(b)fluoranthene	5.7	^{Tot}Soil $_{Comb}$	6,100	^{Air}Soil $_{Inh-v}$	59.8*	5.7	^{Tot}Soil $_{Comb}$	0.050 J	<0.0390	<0.0360	<0.0340	<0.0410	<0.0350	<0.0400	<0.0410
Benzo(g,h,i)perylene	1,800	^{Tot}Soil $_{Comb}$	NE	^{Air}Soil $_{Inh-v}$	119*	119*	Eco	<0.0370	<0.0390	<0.0360	<0.0340	<0.0410	<0.0350	<0.0400	<0.0410
Bis(2-Ethylhexyl) Phthalate	43	^{Tot}Soil $_{Comb}$	NE	^{Air}Soil $_{Inh-v}$	0.925*	0.925*	Eco	NA	NA	NA	NA	NA	NA	NA	NA
Diethyl phthalate	53,000	^{Tot}Soil $_{Comb}$	NE	^{Air}Soil $_{Inh-v}$	100	100	Eco	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	2,300	^{Tot}Soil $_{Comb}$	NE	^{Air}Soil $_{Inh-v}$	122*	122*	Eco	<0.0400	<0.0430	<0.0390	<0.0370	<0.0450	<0.0390	<0.0440	<0.0450
Naphthalene	220	^{Tot}Soil $_{Comb}$	270	^{Air}Soil $_{Inh-v}$	0.0994*	0.0994*	Eco	<0.0390	<0.0420	<0.0380	<0.0360	<0.0440	<0.0380	<0.0430	<0.0430
Phenanthrene	1,700	^{Tot}Soil $_{Comb}$	NE	^{Air}Soil $_{Inh-v}$	45.7*	45.7*	Eco	<0.0370	<0.0390	<0.0360	<0.0340	<0.0410	<0.0350	<0.0400	<0.0410
Pyrene	1,700	^{Tot}Soil $_{Comb}$	NE	^{Air}Soil $_{Inh-v}$	78.5*	78.5*	Eco	<0.0420	<0.0440	<0.0410	<0.0390	<0.0470	<0.0400	<0.0460	<0.0460

Notes:
Analytical Results from HVJ Phase II ESA Trinity River Bridges and Utilities Project prepared for URS, title page dated Nov 2007, Cover letter dated Nov 2008
mg/kg - milligrams per kilogram
NE - Not Established
NA - Not Analyzed
J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
*TRRP Benchmark not available. Benchmark from EPA Region 5 Ecological Screening Levels (ESLs) for soil
http://rais.ornl.gov/tools/eco_search.php
Exceedences of the Critical PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 anc upon a MSD certification for the Dallas Floodway

TABLE 3b
HVJ Phase II ESA (Trinity River Bridges and Utilities Project) Dated 2007 Analytical
Borrow Areas Only
VOCs
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Ecological Benchmarks	Critical PCLs		EB 01 (0-4)	EB 01 (4-8)	EB 02 (0-4)	EB 02 (4-8)	EB 03 (0-4)	EB 03 (4-8)	EB 04 (0-4)	EB 04 (4-8)	EB 05 (0-4)	EB 05 (4-8)	EB 06 (0-4)	EB 06 (4-8)	EB 07 (0-4)	EB 07 (4-8)	EB 08 (0-4)	EB 08 (4-8)	EB 10 (0-4)
Depth of sample:	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Soil	Critical PCLs	Pathway	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'
Date:								10/10/2008	10/10/2008	10/10/2008	10/10/2008	10/10/2008	10/10/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VOCs:																								
Acetone	66,000	$^{Tot}Soil_{Comb}$	600,000	$^{Air}Soil_{Inh-v}$	2.5*	2.5*	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	40,000	$^{Tot}Soil_{Comb}$	200,000	$^{Air}Soil_{Inh-v}$	89.6*	89.6*	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freon-113	NE	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	NE	NE	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	480	$^{Tot}Soil_{Comb}$	13,000	$^{Air}Soil_{Inh-v}$	4.05*	4.05*	Eco	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.010 J	<0.005	<0.005	<0.005	<0.005
Naphthalene	220	$^{Tot}Soil_{Comb}$	270	$^{Air}Soil_{Inh-v}$	0.0994*	0.0994*	Eco	<0.002	<0.002	0.005 J	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002

Notes:
Analytical Results from HVJ Phase II ESA Trinity River Bridges and Utilities Project prepared for URS, title page dated Nov 2007, Cover letter dated Nov 2008
mg/kg - milligrams per kilogram
NE - Not Established
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J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
*TRRP Benchmark not available. Benchmark from EPA Region 5 Ecological Screening Levels (ESLs) for soil
http://rais.ornl.gov/tools/eco_search.php
Exceedences of the Critical PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

TABLE 3b
HVJ Phase II ESA (Trinity River Bridges and Utilities Project) Dated 2007 Analytical
Borrow Areas Only
VOCs
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Ecological Benchmarks	Critical PCLs		EB 10 (4-8)	EB 11 (0-4)	EB 11 (4-8)	EB 12 (0-4)	EB 12 (4-8)	EB 13 (0-4)	EB 13 (4-6)	EB 15 (0-4)	EB 15 (4-6)	EB 16 (0-4)	EB 16 (4-8)	EB 20 (0-4)	EB 20 (4-8)	EB 22 (0-4)	EB 22 (4-8)	EB 23 (0-4)	EB 23 (4-8)
Depth of sample:	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Soil	Critical PCLs	Pathway	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-6'	0-4'	4'-6'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'
Date:								10/9/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/8/2008	10/8/2008
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VOCs:																								
Acetone	66,000	$^{Tot}Soil_{Comb}$	600,000	$^{Air}Soil_{Inh-v}$	2.5*	2.5*	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	40,000	$^{Tot}Soil_{Comb}$	200,000	$^{Air}Soil_{Inh-v}$	89.6*	89.6*	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freon-113	NE	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	NE	NE	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	480	$^{Tot}Soil_{Comb}$	13,000	$^{Air}Soil_{Inh-v}$	4.05*	4.05*	Eco	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007 J	<0.005	<0.005	<0.004	<0.004	<0.004	0.006 J	0.0120 J	<0.005	<0.004	<0.005
Naphthalene	220	$^{Tot}Soil_{Comb}$	270	$^{Air}Soil_{Inh-v}$	0.0994*	0.0994*	Eco	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002

Notes:
Analytical Results from HVJ Phase II ESA Trinity River Bridges and Utilities Project prepared for URS, title page dated Nov 2007, Cover letter dated Nov 2008
mg/kg - milligrams per kilogram
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J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
*TRRP Benchmark not available. Benchmark from EPA Region 5 Ecological Screening Levels (ESLs) for soil
http://rais.ornl.gov/tools/eco_search.php
Exceedences of the Critical PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 20 based upon a MSD certification for the Dallas Floodway

TABLE 3b
HVJ Phase II ESA (Trinity River Bridges and Utilities Project) Dated 2007 Analytical
Borrow Areas Only
VOCs
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Ecological Benchmarks	Critical PCLs		EB 24 (0-4)	EB 24 (4-8)	EB 25 (0-4)	EB 25 (4-8)	EB 26 (0-4)	EB 26 (4-8)	EB 28 (0-4)	EB 28 (4-8)	EB 29 (0-4)	EB 29 (4-8)
Depth of sample:	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Soil	Critical PCLs	Pathway	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'
Date:								10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VOCs:																	
Acetone	66,000	$^{Tot}Soil_{Comb}$	600,000	$^{Air}Soil_{Inh-v}$	2.5*	2.5*	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	40,000	$^{Tot}Soil_{Comb}$	200,000	$^{Air}Soil_{Inh-v}$	89.6*	89.6*	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freon-113	NE	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	NE	NE	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	480	$^{Tot}Soil_{Comb}$	13,000	$^{Air}Soil_{Inh-v}$	4.05*	4.05*	Eco	<0.005	<0.004	<0.004	<0.005	<0.004	<0.004	0.006 J	<0.004	<0.005	<0.005
Naphthalene	220	$^{Tot}Soil_{Comb}$	270	$^{Air}Soil_{Inh-v}$	0.0994*	0.0994*	Eco	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002

Notes:
Analytical Results from HVJ Phase II ESA Trinity River Bridges and Utilities Project prepared for URS, title page dated Nov 2007, Cover letter dated Nov 2008
mg/kg - milligrams per kilogram
NE - Not Established
NA - Not Analyzed
J - Estimated value. Analyte detected below quantitation limits but above sample detection limits.
*TRRP Benchmark not available. Benchmark from EPA Region 5 Ecological Screening Levels (ESLs) for soil
http://rais.ornl.gov/tools/eco_search.php
Exceedences of the Critical PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 20
based upon a MSD certification for the Dallas Floodway

TABLE 3c
HVJ Phase II ESA (Trinity River Bridges and Utilities Project) Dated 2007 Analytical
Borrow Areas Only
Metals
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Ecological Benchmarks	Texas-Specific Background Concentration	Site Specific Background Concentration	Critical PCLs	
Depth of sample (ft): / Date: / Units	Residential Assessment Level mg/kg	Exposure Pathway mg/kg	Residential Assessment Level mg/kg	Exposure Pathway mg/kg	Soil mg/kg	mg/kg	mg/kg	Critical PCLs mg/kg	Pathway mg/kg
Total Metals:									
Arsenic	24	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	18	5.9	13.27	18	Eco
Barium	8,100	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	330	300	275.88	330	Eco
Cadmium	52	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	32	NE	NE	32	Eco
Chromium	33,000	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.4	30	39.92	39.9	SSBC
Lead	500	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	120	15	NE	120	Eco
Mercury	3.6	$^{Tot}Soil_{Comb}$	4.6	$^{Air}Soil_{Inh-v}$	0.1	0.04	NE	0.1	Eco
Selenium	310	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	1.0	0.3	1.14	1.14	SSBC
Silver	97	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	2.0	NE	NE	2.0	Eco

Sample ID:	EB 01 (0-4)	EB 01 (4-8)	EB 02 (0-4)	EB 02 (4-8)	EB 03 (0-4)	EB 03 (4-8)	EB 04 (0-4)	EB 04 (4-8)	EB 05 (0-4)	EB 05 (4-8)	EB 06 (0-4)
Depth of sample (ft):	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'
Date:	10/10/2008	10/10/2008	10/10/2008	10/10/2008	10/10/2008	10/10/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:											
Arsenic	7.38	8.99	8.23	6.66	8.87	8.79	8.04	7.97	8.60	7.35	9.64
Barium	126	157	166	104	152	197	157	89.2	182	**700**	136
Cadmium	0.802	0.836	0.607	0.555	0.805	0.830	0.798	0.799	0.792	0.689	0.739
Chromium	31.1	38.0	38.6	30.5	31.7	36.8	33.2	35.2	38.5	31.9	30.9
Lead	20.7	17.1	16.6	12.9	17.7	17.5	15.5	16.2	17.0	14.4	16.1
Mercury	0.0135	0.0102	0.00592	0.00521	0.0102	0.00645	0.00763	0.00538	0.00730	<0.00110	0.0148
Selenium	0.257 J	0.451 J	<0.202	<0.206	<0.195	<0.203	0.804	0.445 J	0.621	<0.207	<0.202
Silver	<0.0780	<0.0780	<0.0800	<0.0810	<0.0770	<0.0800	<0.0790	<0.0790	<0.0790	<0.0810	<0.0790

Sample ID:	EB 06 (4-8)	EB 07 (0-4)	EB 07 (4-8)	EB 08 (0-4)	EB 08 (4-8)	EB 10 (0-4)	EB 10 (4-8)	EB 11 (0-4)	EB 11 (4-8)	EB 12 (0-4)	EB 12 (4-8)
Depth of sample (ft):	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'
Date:	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:											
Arsenic	9.25	8.93	7.04	7.14	7.08	11.0	8.26	8.42	7.15	7.67	6.48
Barium	137	154	73.7	135	138	160	125	141	170	141	163
Cadmium	3.99	0.723	0.656	0.684	0.725	0.837	0.864	0.672	0.674	0.608	0.589
Chromium	**45.6**	35.0	34.7	38.7	29.9	36.7	38.8	31.3	27.2	32.6	25.7
Lead	20.6	23.0	15.1	16.6	14.9	21.2	15.8	16.9	13.1	15.0	13.4
Mercury	0.00659	0.0243	0.00643	0.00758	0.00570	0.00966	0.00679	0.00865	0.00643	0.00573	0.00643
Selenium	<0.210	0.476 J	<0.206	<0.202	0.272 J	1.03	<0.205	0.414 JB	0.337 JB	0.428 JB	<0.172
Silver	<0.0830	<0.0800	<0.0810	<0.0790	<0.0790	<0.0800	<0.0810	<0.0700	<0.0710	<0.0690	<0.0680

Notes:
Analytical Results from HVJ Phase II ESA Trinity River Bridges and Utilities Project prepared for URS, title page dated Nov 2007, Cover letter
mg/kg - milligrams per kilogram
NE - Not Established
NA - Not Analyzed
J - Estimated value. Analyte detected below quantitation limits but above sample detection
If the concentration of a COC in soil is at or below the median Texas-Specific Background Concentration, the benchmark value may be ignored.
*TRRP Benchmark not available. Benchmark from EPA Region 5 Ecological Screening Levels (ESLs) for soil
http://rais.ornl.gov/tools/eco_search.php
Exceedences of the Critical PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

TABLE 3c
HVJ Phase II ESA (Trinity River Bridges and Utilities Project) Dated 2007 Analytical
Borrow Areas Only
Metals
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Ecological Benchmarks	Texas-Specific Background Concentration	Site Specific Background Concentration	Critical PCLs	
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Soil			Critical PCLs	Pathway
Date:									
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:									
Arsenic	24	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh\text{-}v}$	18	5.9	13.27	18	Eco
Barium	8,100	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh\text{-}v}$	330	300	275.88	330	Eco
Cadmium	52	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh\text{-}v}$	32	NE	NE	32	Eco
Chromium	33,000	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh\text{-}v}$	0.4	30	39.92	39.9	SSBC
Lead	500	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh\text{-}v}$	120	15	NE	120	Eco
Mercury	3.6	$^{Tot}Soil_{Comb}$	4.6	$^{Air}Soil_{Inh\text{-}v}$	0.1	0.04	NE	0.1	Eco
Selenium	310	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh\text{-}v}$	1.0	0.3	1.14	1.14	SSBC
Silver	97	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh\text{-}v}$	2.0	NE	NE	2.0	Eco

Sample ID:	EB 13 (0-4)	EB 13 (4-6)	EB 15 (0-4)	EB 15 (4-6)	EB 16 (0-4)	EB 16 (4-8)	EB 20 (0-4)	EB 20 (4-8)	EB 22 (0-4)	EB 22 (4-8)	EB 23 (0-4)
Depth of sample (ft):	0-4'	4'-6'	0-4'	4'-6'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'
Date:	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/8/2008
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:											
Arsenic	7.24	7.09	6.75	5.51	3.83	3.67	8.67	8.01	7.55	7.55	4.71
Barium	146	117	83.7	91.1	22.1	42.3	77.1	164	104	181	74.2
Cadmium	1.96	0.772	0.543	0.510	0.111 J	0.103 J	1.02	0.741	1.60	0.707	0.550
Chromium	34.1	34.2	1.86	15.2	6.19	9.92	20.8	33.9	34.2	34.6	13.3
Lead	17.2	15.5	10.2	9.48	3.66	5.78	27.5	16.4	59	18.9	16.2
Mercury	0.00720	0.00656	0.00631	0.00534	0.000996	0.00416	0.0485	0.00845	0.0410	0.0135	0.0233
Selenium	<0.167	0.193 J	<0.166	<0.159	<0.153	<0.154	0.634	0.385 J	0.314 J	<0.185	0.275 JB
Silver	<0.0660	<0.0720	<0.0650	<0.0630	<0.0600	<0.0610	<0.0660	<0.0760	<0.0650	<0.0730	<0.0660

Sample ID:	EB 23 (4-8)	EB 24 (0-4)	EB 24 (4-8)	EB 25 (0-4)	EB 25 (4-8)	EB 26 (0-4)	EB 26 (4-8)	EB 28 (0-4)	EB 28 (4-8)	EB 29 (0-4)	EB 29 (4-8)
Depth of sample (ft):	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'
Date:	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Total Metals:											
Arsenic	5.98	8.22	17.2	5.42	8.60	4.49	12.0	13.3	14.3	10.1	10.2
Barium	74.8	133	32.1	83.5	115	56.4	45.6	188	16.7	86.7	175
Cadmium	1.41	1.20	0.743	0.645	2.04	0.148 J	0.469	1.73	0.542	0.796	0.742
Chromium	26.0	30.2	9.66	16.3	38.3	9.69	8.23	38.7	7.63	18.8	30.8
Lead	55.2	54.5	5.79	20.4	86.4	6.78	5.38	21.8	5.25	23.6	19.0
Mercury	0.0536	0.0653	0.00288	0.0302	0.0930	0.00604	0.00123 J	0.0311	0.00416	0.0379	0.0216
Selenium	0.302 JB	0.419 JB	**1.26**	<0.178	0.476 JB	<0.168	0.464 B	<0.192	0.579 B	1.02	<0.186
Silver	<0.0660	<0.0650	<0.0620	<0.0700	<0.0700	<0.0660	<0.0560	<0.0760	0.794	<0.0660	<0.0730

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http://rais.ornl.gov/tools/eco_search.php
Exceedences of the Critical PCL are in **BOLD** text and highlighted in Orange
The TCEQ TRRP Tier 1 PCLs were determined using Table 1 of the TCEQ Tier 1 Residential Soil PCLs updated June 29, 2012 and based upon a MSD certification for the Dallas Floodway

TABLE 3d
HVJ Phase II ESA (Trinity River Bridges and Utilities Project) Dated 2007 Analytical
Borrow Areas Only
Pesticides and PCBs
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Ecological Benchmarks	Critical PCLs		EB 01 (0-4)	EB 01 (4-8)	EB 02 (0-4)	EB 02 (4-8)	EB 03 (0-4)	EB 03 (4-8)	EB 04 (0-4)	EB 04 (4-8)	EB 05 (0-4)	EB 05 (4-8)	EB 06 (0-4)	EB 06 (4-8)	EB 07 (0-4)	EB 07 (4-8)	EB 08 (0-4)	EB 08 (4-8)	EB 10 (0-4)	EB 10 (4-8)
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Soil	Critical PCLs	Pathway	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'
Date:								10/10/2008	10/10/2008	10/10/2008	10/10/2008	10/10/2008	10/10/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008	10/9/2008
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Pesticides:																									
4,4-DDD	14	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.00332*	0.00332*	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4-DDE	10	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.758*	0.758*	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4-DDT	5.4	$^{Tot}Soil_{Comb}$	1,200	$^{Air}Soil_{Inh-v}$	0.596*	0.596*	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	0.05	$^{Tot}Soil_{Comb}$	8.3	$^{Air}Soil_{Inh-v}$	0.0035*	0.0035*	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan Sulfate	380	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.0358*	0.0358*	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs:																									
Aroclor-1254	1.1	$^{Tot}Soil_{Comb}$	54	$^{Air}Soil_{Inh-v}$	40	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	1.1	$^{Tot}Soil_{Comb}$	54	$^{Air}Soil_{Inh-v}$	40	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
Analytical Results from HVJ Phase II ESA Trinity River Bridges and Utilities Project prepared for URS, title page dated Nov 2007, Cover letter dated Nov 2008
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Exceedences of the Critical PCL are in **BOLD** text and highlighted in Orange
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TABLE 3d
HVJ Phase II ESA (Trinity River Bridges and Utilities Project) Dated 2007 Analytical
Borrow Areas Only
Pesticides and PCBs
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Ecological Benchmarks	Critical PCLs		EB 11 (0-4)	EB 11 (4-8)	EB 12 (0-4)	EB 12 (4-8)	EB 13 (0-4)	EB 13 (4-6)	EB 15 (0-4)	EB 15 (4-6)	EB 16 (0-4)	EB 16 (4-8)	EB 20 (0-4)	EB 20 (4-8)	EB 22 (0-4)	EB 22 (4-8)	EB 23 (0-4)	EB 23 (4-8)	EB 24 (0-4)	EB 24 (4-8)
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Soil	Critical PCLs	Pathway	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-6'	0-4'	4'-6'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'
Date:								10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/7/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Pesticides:																									
4,4-DDD	14	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.00332*	0.00332*	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00117 J	<0.000173	<0.000161	<0.000169	<0.000152	<0.000166	<0.000167	<0.000155
4,4-DDE	10	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.758*	0.758*	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000156	<0.000173	<0.000161	<0.000169	<0.000152	<0.000166	<0.000167	<0.000155
4,4-DDT	5.4	$^{Tot}Soil_{Comb}$	1,200	$^{Air}Soil_{Inh-v}$	0.596*	0.596*	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.000981 J	<0.000144	0.00131 J	<0.000141	0.000850 J	<0.000138	<0.000139	<0.000129
Aldrin	0.05	$^{Tot}Soil_{Comb}$	8.3	$^{Air}Soil_{Inh-v}$	0.0035*	0.0035*	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000156	<0.000173	<0.000161	<0.000169	<0.000152	<0.000166	<0.000167	<0.000155
Endosulfan Sulfate	380	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.0358*	0.0358*	Eco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000494	<0.000547	<0.000509	<0.000537	0.000482 J	<0.000526	<0.000529	<0.000490
PCBs:																									
Aroclor-1254	1.1	$^{Tot}Soil_{Comb}$	54	$^{Air}Soil_{Inh-v}$	40	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	1.1	$^{Tot}Soil_{Comb}$	54	$^{Air}Soil_{Inh-v}$	40	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
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TABLE 3d
HVJ Phase II ESA (Trinity River Bridges and Utilities Project) Dated 2007 Analytical
Borrow Areas Only
Pesticides and PCBs
Dallas Floodway Borrow Area Environmental Evaluation
Dallas, Texas

Sample ID:	TRRP Tier 1 Residential Surface Soil PCLs		TRRP Tier 1 Residential Subsurface Soil PCLs		Ecological Benchmarks	Critical PCLs		EB 25 (0-4)	EB 25 (4-8)	EB 26 (0-4)	EB 26 (4-8)	EB 28 (0-4)	EB 28 (4-8)	EB 29 (0-4)	EB 29 (4-8)
Depth of sample (ft):	Residential Assessment Level	Exposure Pathway	Residential Assessment Level	Exposure Pathway	Soil	Critical PCLs	Pathway	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'	0-4'	4'-8'
Date:								10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Pesticides:															
4,4-DDD	14	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.00332*	0.00332*	Eco	<0.000153	<0.000163	<0.000149	<0.000144	<0.000194	<0.000149	<0.000168	<0.000171
4,4-DDE	10	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.758*	0.758*	Eco	<0.000153	<0.000163	<0.000149	<0.000144	<0.000194	<0.000149	<0.000169	<0.000171
4,4-DDT	5.4	$^{Tot}Soil_{Comb}$	1,200	$^{Air}Soil_{Inh-v}$	0.596*	0.596*	Eco	0.00215	0.000350 J	<0.000125	<0.000120	<0.000161	<0.000124	0.000157 J	<0.000143
Aldrin	0.05	$^{Tot}Soil_{Comb}$	8.3	$^{Air}Soil_{Inh-v}$	0.0035*	0.0035*	Eco	<0.000153	<0.000163	<0.000149	<0.000144	<0.000194	<0.000149	<0.000169	<0.000171
Endosulfan Sulfate	380	$^{Tot}Soil_{Comb}$	NE	$^{Air}Soil_{Inh-v}$	0.0358*	0.0358*	Eco	<0.000485	<0.000515	<0.000473	<0.000457	<0.000613	<0.000472	<0.000534	<0.000543
PCBs:															
Aroclor-1254	1.1	$^{Tot}Soil_{Comb}$	54	$^{Air}Soil_{Inh-v}$	40	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	1.1	$^{Tot}Soil_{Comb}$	54	$^{Air}Soil_{Inh-v}$	40	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
Analytical Results from HVJ Phase II ESA Trinity River Bridges and Utilities Project prepared for URS, title page dated Nov 2007, Cover letter dated Nov 2008
mg/kg - milligrams per kilogram
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TECHNICAL MEMORANDUM

ATTACHMENT 3

BACKGROUND CALCULATIONS

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Site Specific Background PCLs
Trinity Floodway Investigation
CH2M Hill Analytical Data
Dallas, Tx

			Analyzed Background Constituents			
	Sample I.D.	Sample Depth	Arsenic	Barium	Chromium	Selenium
	SB001	0 - 2	4.09	107	12.3	0.6
	SB001	5 - 7	5.48	138	18.7	0.156
	SB002	0 - 2	5.26	132	22.9	0.31
	SB002	6 - 8	4.53	65.6	13	0.153
	SB003	0 - 2	4.93	97.2	17.3	0.155
	SB003	4 - 6	9.61	50.5	8.74	0.11
	SB005	0 - 2	5.65	119	24.4	0.392
	SB005	6 - 8	5.77	212	22.9	0.237
	SB006	0 - 2	4.85	78.5	16.3	0.16
	SB006	10 - 12	7.56	180	24.3	0.405
	SB007	0 - 2	3.48	70.1	6.23	0.522
	SB007	4 - 6	4.25	170	14	0.59
	SB008	0 - 2				
	SB008	10 - 12	4.95	176	19.8	0.618
	SB009	0 - 2	8.73	183	41.2	0.256
	SB009	3 - 5	7.29	80.2	6.25	0.78
	SB010	0 - 2	11.5	129	48.5	0.492
	SB010	4 - 6	**21**	44.5	5.04	1
	SB011	0 - 2	13.5	228	39.8	0.615
	SB011	6 - 8	5.03	130	18.4	0.359
	SB012	0 - 2	7.3	149	31.6	0.563
	SB012	10 - 12	9.72	208	28.5	0.631
	SB013	0 - 2	6.48	145	**48.6**	0.603
	SB013	13 - 15	6.54	**348**	23.9	0.426
	SB014	5 - 7	10.1	123	18.2	0.485
	SB014	13 - 15	9.15	50.6	25.1	0.376
	SB015	0 - 2	15.9	67.6	10.2	0.686
	SB015	3 - 5	14.5	66.5	9.43	1.62
	SB016	0 - 2				
	SB016	2 - 4				
	SB016	6 - 8	9.38	194	19.8	0.455
Borrow	SB017	0 - 2				
	SB017	13 - 15				
	SB018	0 - 2	6.89	84.8	38.7	0.375
	SB018	0 - 2	5.95	126	21.2	0.462
	SB018	4 - 6	6.3	123	28.5	0.398
Borrow	SB019	0 - 2				
	SB019	12 - 14				
	SB019	12 - 14				
	SB020	0 - 2	9.84	59.6	8.4	0.525
	SB020	13 - 15	5.3	135	17.2	0.4
	SB021	0 - 2	6.67	147	19.8	0.484
	SB021	4 - 6	5.29	117	18.2	0.28
Borrow	SB022	0 - 2				
	SB022	0 - 2				
	SB022	13 - 15				
	SB023	0 - 2	18.3	51.3	6.49	1
	SB024	0 - 2				
	SB024	13 - 15	5.4	182	17.9	0.645
Borrow	SB025	0 - 2				
	SB025	13 - 15				
	SB026	0 - 2	11.2	43.3	6.64	0.572
	SB026	4 - 6	4.19	147	12.8	0.603
	SB027	0 - 2	8.34	200	27	0.61
	SB027	13 - 15	8.08	184	45.4	0.693
	SB028	0 - 2	8.19	46.8	9.87	**2.94**
	SB028	4 - 6	9.83	91.1	19.8	0.605
	SB029	0 - 2	5.28	163	28.1	0.631
	SB029	9 - 11	6.25	71.4	17.1	0.61
	SB030	0 - 2	6.94	162	28.4	0.627
	SB030	4 - 6	4.72	168	25.3	0.639
	SB031	0 - 2				
	SB031	4 - 6				
Borrow	SB032	0 - 2				
	SB032	13 - 15				
	SB033	0 - 2	3.46	**348**	10.6	0.559
	SB033	3 - 5	6.51	144	26.2	0.643
	SB034	0 - 2	5.71	172	21.9	0.603
	SB034	4 - 6	4.2	210	21	0.595
	SB034	4 - 6	5.55	128	20.9	0.118
	SB035	0 - 2	6.86	99.5	15.6	0.634
	SB035	3 - 5	9.49	162	35.8	0.478
Borrow	SB036	0 - 2				

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	SB036	13 - 15				
	SB038	0 - 2	5.27	125	19.6	0.616
	SB038	3 - 5	5.27	136	18.7	0.403
	SB039	0 - 2	6.07	126	24.2	0.608
	SB039	4 - 6	7.54	161	25.8	0.208
	SB041	0 - 2	4.93	87.1	18.5	0.196
	SB041	13 - 15	5.74	143	20.9	0.211
	SB042	0 - 2	6.71	123	24.5	0.592
	SB042	4 - 6	6.21	190	29	0.635
	SB043	0 - 2	6.18	135	27.5	0.135
	SB043	13 - 15	5.6	84.5	23.9	0.606
Borrow	SB044	0 - 2				
	SB044	13 - 15				
	SB045	0 - 2	2.83	92.1	11.6	0.558
	SB045	4 - 6	3.89	108	17.1	0.63
	SB053	0 - 2	6.03	169	23.1	0.302
	SB053	4 - 6	7.73	250	23.4	0.514
	SB054	0 - 2	6.01	125	22.2	0.39
	SB054	4 - 6	6.24	309	25	0.286
	SB055	0 - 2	5.27	157	20.2	0.598
	SB055	4 - 6	6.2	204	23.8	0.689
	SB056	0 - 2	6.09	82.2	8.46	0.298
	SB056	3 - 5	6.66	152	19.4	0.428
	SB057	0 - 2	6.64	118	25.2	0.515
	SB057	13 - 15	6.37	247	19.3	0.496
	SB058	0 - 2	5.96	133	22.4	0.641
	SB058	13 - 15	4.87	32.7	15.2	0.61
	SB059	0 - 2	9.63	200	24.2	0.776
	SB059	0 - 2	8.43	159	27.3	0.446
	SB059	13 - 15	6.04	89.9	18.7	0.572
	SB060	0 - 2	8.21	166	25.5	0.585
	SB060	0 - 2	9.09	183	27.8	0.574
	SB060	13 - 15	6.95	140	23.2	0.631
	SB061	0 - 2				
	SB061	13 - 15				
	SB062	0 - 2	7.37	177	30.2	0.286
	SB062	13 - 15	7.19	201	28.3	0.499
	SB063	0 - 2	6.07	137	26.3	0.629
	SB063	3 - 5	5.69	96.6	27.1	0.631
	SB064	0 - 2				
	SB064	0 - 2				
	SB064	5 - 7	5.54	33.9	6.93	0.258
	SB065	0 - 2	4.36	56.5	15.6	0.486
	SB065	0 - 2	5.03	221	13.3	0.533
	SB065	12 - 14	19.1	27.9	9.31	0.494
	SB066	0 - 2	4.37	39.2	9.81	0.231
	SB066	0 - 2	7.07	43.2	11.8	0.183
	SB066	9 - 11	20.8	14.6	17.8	0.421
	SB067	0 - 2	4.9	87.1	12.3	0.642
	SB067	0 - 2	6.7	83.9	14.7	0.357
	SB067	4 - 6	3.27	57.5	12.9	0.304
	SB068	0 - 2	6.11	108	26.6	0.616
	SB068	0 - 2	5.57	113	22.8	0.626
	SB068	13 - 15	5.18	151	25.6	0.646
	SB069	0 - 2	7.01	129	25.7	0.646
	SB069	13 - 15	6.2	168	26.3	0.705
	SB070	0 - 2	6.58	107	18.7	0.325
	SB070	0 - 2	6.99	123	19.6	0.686
	SB070	4 - 6	5.61	107	22.4	0.37
	SB071	0 - 2	6.09	165	21.9	0.613
	SB071	4 - 6	5.28	134	28.7	0.61
	SB072	0 - 2	4.34	187	17.5	0.59
	SB072	13 - 15	5.71	162	30.6	0.644
	SB073	0 - 2	6.8	257	21.9	0.623
	SB073	13 - 15	5.61	326	27.8	0.661
	SB074	0 - 2	6.05	104	24.7	0.603
	SB074	0 - 2	6.9	149	23.1	0.624
	SB074	13 - 15	5.47	84	22.9	0.639
	SB075	0 - 2	5.09	103	15.9	0.616
	SB075	13 - 15	6.81	152	21.4	0.664
	SB076	0 - 2	4.04	130	12	0.176
	SB076	4 - 6	6.91	109	10.4	0.124
	SB077	0 - 2	2.13	239	12.6	0.127
	SB077	4 - 6	1.87	175	13.5	0.592
	SB078	0 - 2	3.92	99.7	20.2	0.628
	SB078	3 - 5	3.76	91.7	19.4	0.616
	SB079	0 - 2	6.41	124	21.9	0.624
	SB079	13 - 15	5.73	63.2	15.5	0.601
	SB080	0 - 2	5.1	122	25	0.642

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SB080	13 - 15	5	102	17.7	0.609
SB081	0 - 2	4.37	73.2	15.2	0.566
SB081	4 - 6	2.09	27.9	5.91	0.554
SB082	0 - 2	4.87	213	23.4	0.433
SB082	0 - 2	4.79	109	23.5	0.324
SB082	13 - 15	4.58	188	20.8	0.194
SB083	0 - 2	4.19	168	20.8	0.401
SB083	0 - 2	3.14	148	18.8	0.286
SB083	13 - 15	3.51	95.9	23.4	0.623
SB084	0 - 2	5.51	232	25.9	0.451
SB084	13 - 15	5.54	257	26.6	0.296
SB085	0 - 2	3.89	238	29.3	0.339
SB085	12 - 14	4.82	164	26.9	0.66
SB086	0 - 2	4.64	144	31.4	0.255
SB086	0 - 2	4.61	164	29.4	0.297
SB086	13 - 15	5.54	181	29.1	0.401
SB087	0 - 2	4.75	188	30.4	0.345
SB087	0 - 2	5.56	153	31.7	0.338
SB087	5 - 7	4.92	145	32	0.403
SB088	0 - 2				
SB088	0 - 2				
SB088	4 - 6	4.75	83.3	29	0.312
SB089	0 - 2	6.28	155	24.3	0.623
SB089	4 - 6	6.39	148	21.8	0.16
SB090	0 - 2	5.32	103	19.7	0.229
SB090	13 - 15	6.05	115	27	0.19
SB091	0 - 2	4.39	170	23.7	0.613
SB091	4 - 6	6.32	127	22.4	0.624
SB092	0 - 2	6.57	119	24.1	0.276
SB092	13 - 15	7.78	81	24	0.303
SB093	0 - 2	5.22	109	18.7	0.205
SB093	0 - 2	6.41	125	23.2	0.25
SB093	13 - 15	6.04	151	30.4	0.21
SB094	0 - 2	5.89	138	30	0.611
SB094	13 - 15	6.01	149	24.2	0.329

Statistical Results				
Analyte	Arsenic	Barium	Chromium	Selenium
Coefficient of Variation Normality Test*	0.45788944	0.44320247	0.36615599	0.56203315
Normal Data?	Normal	Normal	Normal	Normal
Number of Samples	159	159	159	159
Mean (μ)	6.48050314	136.848428	21.6069811	0.50021384
Standard Deviation (σ)	2.967	60.652	7.912	0.281
K (tolerance factors)	2.292	2.292	2.292	2.292
Tolerance Limit (TL)**	6.80117531	139.013378	18.1332164	0.64436545
95% CI = Mean + TL	13.2816785	275.861806	39.7401975	1.14457929

Grubbs Outlier Test				
Lowest Sample Concentration (Min.)	1.87	14.6	5.04	0.11
Highest Sample Concentration (Max.)	21	348	48.6	2.94
Grubbs Min. Value	1.55374222	2.01558583	2.0940312	1.38798582
Grubbs Max. Value	4.89307881	3.48138726	3.4118602	8.67828939
Critical Values ***	2.663	2.663	2.663	2.663
Is the lowest concentration an outlier?	No	No	No	No
Is the highest concentration an outlier?	Yes	Yes	Yes	Yes

* - Compares the coefficient of variation (CV = σ/μ) versus a value of 1.00. If the CV is greater than 1, then the sample

** - The Tolerance Limit (TL) is = to K * σ

*** - The Grubbs Min. and Max. Values are derived from the highest and lowest concentrations in a sample population. The Grubbs Values are then compared versus critical values and if the Grubbs value is higher than the critical value, the

Cells highlighted in orange indicate concentrations below the lab SQL, so the SQL was used.

REMOVED HIGHEST
OUTLIER UNTIL
NORMAL RESULT
REACHED

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Appendix G-2

TCEQ Section 401 Water Quality Certification Questionnaire

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APPENDIX G-2

TCEQ SECTION 401 WATER QUALITY CERTIFICATION QUESTIONNAIRE

I. Impacts to Surface Water in the State, Including Wetlands

A. What is the area of surface water in the State, including wetlands that will be disturbed, altered, or destroyed by the proposed activity?

The total acreage of surface water in the state that will be disturbed, altered, or destroyed by the project is estimated to be 65.55 acres. The categories of water and nature of impact are provided in **Table G-2-1**.

TABLE G-2-1. SUMMARY OF POTENTIAL IMPACTS TO AQUATIC FEATURES

AQUATIC FEATURE TYPE	POTENTIAL FILL IMPACTS (ACRES)*		
	ROW FILL	EXCAVATION	TOTAL
Emergent Wetland	18.99	31.26	50.25
Forested Wetland	1.40	0	1.40
River or Stream Channel	4.23	2.80	7.03
Old River Channel (Open Water)	0.74	0	0.74
Other Open Water	4.61	1.52	6.13
TOTAL	**29.97**	**35.58**	**65.55**

Notes:
1. * Calculated areas are estimates only. ROW fill impacts are expected from roadway construction; excavation impacts are expected from potential borrow areas (see FEIS Appendix G-1 Maps 3 and 4 for borrow area locations).
2. Potential impacts to waters of the U.S., including wetlands, may occur from bridge column construction and would likely be substantially reduced or eliminated during final design.
3. Expected impacts are based on the jurisdictional determination approved by USACE on June 19, 2006 (File # SWF-2000-00308).

B. Is compensatory mitigation proposed? If yes, submit a copy of the mitigation plan. If no, explain why not.

Compensatory mitigation is proposed. See **FEIS Appendix G-3**.

C. *Please complete the attached Alternatives Analysis Checklist.*

The Alternatives Analysis Checklist has been completed and is attached at the end of this document.

II. Disposal of Waste Materials

A. *Describe the methods for disposing of materials recovered from the removal or destruction of existing structures.*

The project will involve displacements of residential, commercial/industrial, and public facilities, thereby requiring the removal and destruction of existing structures. Prior to any renovation or demolition, an asbestos inspector licensed by the Texas Department of State Health Services (TDSHS) would perform a comprehensive asbestos survey of the area(s) to be renovated or demolished to verify the asbestos content of potentially disturbed materials. At that time, proper asbestos abatement procedures developed by a licensed asbestos consultant would be followed for all identified asbestos containing materials.

All materials from the demolition and abatement activities will be removed from the project area and disposed at a registered disposal facility designed and operated in compliance with local, state, and federal requirements.

B. *Describe the methods for disposing of sewage generated during construction. If the proposed work establishes a business or a subdivision, describe the method for disposing of sewage after completing the project.*

The proposed project would not generate sewage before, during, or after construction. Sewage generated by construction workers will be collected in portable units and disposed of at an off-site treatment facility with no impact on water quality in the project area.

C. *For marinas, describe plans for collecting and disposing of sewage from marine sanitation devices. Also, discuss provisions for the disposing of sewage generated from day-to-day activities.*

Not applicable.

III. Water Quality Impacts

A. Describe the methods to minimize the short-term and long-term turbidity and suspended solids in the waters being dredged and/or filled. Also, describe the type of sediment (sand, clay, etc.) that will be dredged or used for fill.

Excavated material used for fill will come from within the Dallas Floodway and consist primarily of native clays. The project would include five or more acres of earth disturbance. TxDOT would comply with the Texas Commission on Environmental Quality (TCEQ) TPDES CGP. A Storm Water Pollution Prevention Plan (SW3P) would be implemented, and a construction site notice would be posted on the construction site. A Notice of Intent (NOI) would be required.

During construction, the Applicant would use best management practices (BMPs) to limit erosion and reduce sediment transport that result from storm water runoff from the proposed Trinity Parkway and disturbance areas. Surface water control facilities would be installed as necessary to control off-site runoff to receiving waterways (i.e., Trinity River) during construction. Prompt and effective revegetation of disturbed areas along the fringes of the proposed project would further reduce the potential for erosion. Project construction will occur over several years; routine and seasonal site maintenance would include inspection and repair of drainage and sediment control facilities and installed erosion controls, routine landscape maintenance, and the cleaning of sediment ponds and ditches.

B. Describe measures that will be used to stabilize disturbed soil areas, including: dredge material mounds, new levees or berms, building sites, and construction work areas. The description should address both short-term (construction related) and long-term (normal O&M) measures. Typical measures might include containment structures, drainage modifications, sediment fences, or vegetative cover. Special construction techniques intended to minimize soil or sediment disruption should also be described.

During and immediately following construction, there would be exposed soils. Soils within the ROW, in general, are classified as having slight to moderate potential for erosion. Erosion is expected to be limited to the immediate vicinity of the proposed roadway, new embankment slopes, and at interchanges and overpasses; the greatest potential for soil erosion would occur during the construction period. The amount of disturbed earth would be limited to that necessary for construction in the immediate area so that potential for excessive erosion is minimized and sedimentation outside of the ROW is avoided. Existing vegetation would be preserved wherever possible. Temporary erosion and sedimentation control measures such as silt fences, rock berms, sedimentation basins, and/or soil retention blankets would be implemented as needed prior to the initiation of construction. Permanent soil erosion control features would be constructed as soon as feasible through proper sod placement and/or seeding techniques. Disturbed areas would be restored and stabilized as soon as the construction schedule permits, and temporary sod would be considered where large areas of disturbed ground would be left bare for a considerable length of time.

C. Discuss how hydraulically dredged materials will be handled to ensure maximum settling of solids before discharging the decant water. Plans should include a calculation of minimum settling times with supporting data (Reference: Technical Report, DS-7810, Dredge Material Research Program, GUIDELINES FOR DESIGNING, OPERATING, AND MAINTAINING DREDGED MATERIAL CONTAINMENT AREAS). If future maintenance dredging will be required, the disposal site should be designed to accommodate additional dredged materials. If not, please include plans for periodically removing the dried sediments from the disposal area.

Hydraulic dredging is not anticipated for this project, but may be an option to desilt temporary sedimentation ponds used during construction. Any decant water would be retained until suspended solids have largely settled out.

D. Describe any methods used to test the sediments for contamination, especially when dredging in an area known or likely to be contaminated, such as downstream of municipal or industrial wastewater discharges.

Hydraulic dredging is not anticipated for this project. Avoiding hazardous waste sites would be a priority during the final design stage. Site assessments would be conducted to identify the levels of contamination and, if necessary, evaluate the options to remediate. Resolution of any concerns associated with contamination would be coordinated with the appropriate regulatory agencies prior to ROW acquisition, and appropriate action would be taken.

Any required mitigation of identified hazardous material concerns would include those for proper management and disposal of hazardous wastes encountered during construction and precautions for worker health and safety. In the event that hazardous materials are unexpectedly encountered during construction, a contingency plan or other health and safety procedures would be in place establishing procedures for temporary stoppage of work, securing of the area, notification of the discovery, and proper management of such materials. All procedures would be consistent with federal, state, and local laws and regulations.

ALTERNATIVES ANALYSIS CHECKLIST FOR THE
TRINITY PARKWAY NORTH TEXAS TOLLWAY AUTHORITY

I. Alternatives

A. How could you satisfy your needs in ways that do not affect surface water in the state?

The primary purpose of the project is to improve local traffic mobility, manage congestion, increase safety, and help manage future travel demand near downtown Dallas. The project meets the need for an additional reliever route to accomplish the intended purpose. Alternatives that would likely reduce the impacts to surface water features were considered. However, these alternatives were deemed not practicable due to excessive cost, physical constraints, and impacts to adjacent properties (see **FEIS Chapter 2**). Furthermore, transportation improvements to other local facilities may not be considered a viable alternative; regional planning efforts identified measures for several distinct geographic locations in the region to address the stated purpose, of which the project is just one required component. Therefore, these are not viable alternatives that would satisfy the needs of the proposed project.

B. How could the project be re-designed to fit the site without affecting surface water in the state?

As noted above, there are alternatives that were considered that minimize impacts to surface waters. Of the other alternatives considered, given their location with respect to the Dallas Floodway, total avoidance would be difficult. Re-design would have to consider bridging the entire length of the alternatives, and even then, given the length of the project, total avoidance may still not be achieved.

C. How could the project be made smaller and still meet your needs?

The Trinity Parkway Corridor Major Transportation Investment Study (MTIS) (TxDOT, 1998a) indicated that an eight-lane reliever route (reducing to six lanes in the southern segment) would provide approximately 50 percent of the goal for transportation capacity improvement in the Canyon, Mixmaster, and Lower Stemmons Freeway corridors. The proposed Build Alternatives have been reduced from eight lanes to six lanes (see **Part II** of this document). Any further significant reduction would not meet the needs of the project. Only if projected traffic trends decrease could the project be made smaller in extent.

D. What other sites were considered?

1. What geographical area was searched for alternative sites?

The nature of the purpose and need (i.e., localized in downtown Dallas and within the regional road network) limit the geographic location of project alternatives. The Trinity Parkway Corridor MTIS focused on a study area surrounding the Trinity River and the Dallas Central Business District (CBD) because management solutions were needed in this area where traffic congestion was a worsening problem. Early local and regional planning efforts identified measures for several distinct geographic locations (in which the Trinity Parkway was included). The MTIS action plan identified a variety of measures in various geographic locations within the Trinity Parkway Corridor MTIS Study Area. However, an important distinction is that regional planning efforts concluded that all identified measures were needed, and that no single measure, or combination of less than those measures, would meet transportation demand and address transportation problems in the target area. Various local and state agencies have taken responsibility for implementation of the other portions (i.e., locations) identified in regional planning efforts. Still, the Trinity Parkway project has considered four distinct Build Alternatives (**Part II** of this document); given the scale of the project, these Build Alternatives manage to occupy different and distinct urban landscapes within the downtown Dallas area.

2. How did you determine whether other non-wetland sites are available for development in the area?

It is very likely that the footprint of any new linear transportation project of comparable size within the North Central Texas region will contain surface waters of the state, and thus no other area exists where a project could be constructed without impacts to surface water features. Given that the purpose and need is based in the downtown Dallas area, the inability to not cross surface waters of the state becomes more recognized given the proximity of the Trinity River. Alternatives were developed and evaluated based on their ability to meet the need and purpose of the proposed project. This analysis process reduced the number of alternatives over time and allowed a higher level of detailed analysis on the remaining candidates. Comparisons of alternatives for the Trinity Parkway Corridor were developed considering a host of factors, including environmental effects, cost effectiveness, social and economic effects, compatibility with other regional projects, mobility benefits, and effects from construction. Environmental effects, which include surface waters of the state, were only a component of all the different factors considered in the development of alternatives.

3. *In recent years, have you sold or leased any lands located within the vicinity of the project? If so, why were they unsuitable for the project?*

Not applicable.

E. What are the consequences of not building the project?

Selection of the No-Build Alternative would result in no direct impact to aquatic resources. Although the No-Build Alternative avoids construction impacts, the lack of a northwest-southeast reliever route around downtown Dallas would remain. The costs associated with the No-Build Alternative, along with the adverse impacts related to traffic congestion, such as air pollution, noise, and decreased pedestrian and vehicular safety, could create an undesirable urban environment that would have more long-term adverse impacts than the short-term construction impacts. In the absence of improvements, the maintenance costs of the existing system will continue to increase. The public will experience increased vehicle operating costs on under-designed, inadequate facilities and other costs due to higher rates of accidents and incidents on existing facilities. Motorists will also experience a monetary value of time lost due to lower operating speeds, congested roadway conditions, and restricted maneuverability on area roadways. In sum, the No-Build Alternative does not meet the purpose and need for the proposed project.

II. Comparison of Alternatives

As many as eight Build Alternatives and the No-Build Alternative have been studied. Four of these alternatives have been eliminated from further study and are not discussed further in this analysis. Descriptions of these alternatives, followed by a justification for elimination, are provided in the **FEIS Chapter 2.** In light of foregoing constraints on the development of alternatives, the Applicant has endeavored to develop and has considered multiple distinct Build Alternatives that would meet the overall project purpose. In addition, other project area attributes such as proximity to major transportation thoroughfares and the Dallas Floodway, have guided the development of geographically diverse Build Alternatives within the highly urbanized Dallas CBD.

In addition to meeting the purpose and needs of the proposed project, alternatives must also be considered practicable. As described in **FEIS Appendix G-1, Section 1.0**, the USACE defines practicable alternatives as those that are available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall purpose. The USACE does not evaluate these three factors collectively in assessing practicability, but separately examines each alternative in light of each factor to determine whether an alternative is practicable as to that factor. The determination as to whether a given alternative is practicable is the result of weighing of pertinent factors by the USACE in reaching a finding that the alternative would likely be built if selected (i.e., is "capable of being done"). Thus, the focus of the analysis is whether each alternative would realistically be able to be constructed even if it were the only Build Alternative.

The alternatives under consideration in the Trinity Parkway FEIS are Build Alternatives 2A, 2B, 3C, and 4B (as described in **FEIS Appendix G-1, Section 2.3**). The Applicant seeks to receive authorization under Section 404 for fill and excavation impacts necessary to construct Trinity Parkway Alternative 3C. Although Alternatives 2A and 2B would not avoid impacts to aquatic resources, these alternatives would result in substantially fewer impacts to aquatic resources than Alternative 3C. For this reason, application of the Section 404(b)(1) Guidelines to the Trinity Parkway requires the consideration of these two alternatives in the 404 practicability analysis in addition to Alternative 3C. The 404 practicability screening process ultimately results in the identification of a single alternative that meets the criteria of practicability and minimized impacts to aquatic resources. Reasons for eliminating Build Alternative 4B from consideration are summarized below.

The Section 404(b)(1) Guidelines require the Applicant to seek out action alternatives that minimize impacts to aquatic resources (40 CFR Section 230.10(a)). The Applicant has developed and evaluated Alternative 4B in terms of meeting the overall project purpose and in terms of impacts. However, as compared to the other three alternatives under consideration, the impacts to aquatic resources (i.e., primarily emergent wetlands) from Alternative 4B would be approximately 20 acres greater than Alternative 3C, which is the next greatest in terms of such impacts among the alternatives. Other concerns regarding Alternative 4B identified in the SDEIS (see **SDEIS Table 4-65**) are related to the following types of impacts that are relatively great as compared to other alternatives: recreation areas, the number of noise receivers affected, floodplain encroachment, and rise in the water surface elevation of the Standard Project Flood. For these primary reasons, the Applicant has not submitted Alternative 4B for consideration of a Section 404 permit.

The three Build Alternatives that would meet the purpose and need of the proposed Trinity Parkway are summarized below. A detailed description of the alternatives may also be found in **FEIS Chapter 2**.

- **Alternative 2A: Irving/Industrial Boulevard (Elevated)** - Roadway is installed as a six-lane double-deck structure, above existing city streets.
- **Alternative 2B: Irving/Industrial Boulevard (At Grade)** - Similar to 2A, the facility is maintained as six lanes throughout, and the existing lanes on Industrial/Irving Boulevards and Lamar Street are replaced as frontage roads.
- **Alternative 3C: Combined Parkway (Further Modified)** - A six-lane staged roadway constructed within the floodway on the riverside face of the east levee.

A. How do the costs compare for the alternatives considered above?

Alternative 2A costs substantially more ($2.36 billion) than the other alternatives primarily because the majority of the alignment would have to be built on elevated structures. Also factored in this cost are a substantial amount of property acquisition and the relocation of major utilities. Alternative 2B which follows the same general alignment as Alternative 2A costs less ($1.87 billion) because the facility would be constructed at grade; however, the costs for property acquisition and the relocation of major utilities is still comparable. Thus, the cost of Alternative 2A is still substantially higher than Alternative 3C ($1.42 billion) which has comparatively lower property acquisition costs and utility relocation requirements.

B. *Are there logistical (location, access, transportation, etc.) reasons that limit the alternatives considered?*

The project schedule is the primary logistic consideration in determining practicability. The length of time from construction to fully open to traffic is important because within that timeframe, there is potential for disruption to major traffic pathways, as well as disruption to local streets that provide access to businesses and residents in the project area. As noted in **Part II.A**, ROW acquisition and utility relocation requirements vary between alternatives. Not only do these requirements influence cost, but they can also drastically impact the project schedule. Construction timeframes are estimated at 9-10 years for Alternative 2A or Alternative 2B; construction timeframes are estimated at approximately 6-7 years for Alternative 3C.

C. *Are there technological limitations for the alternatives considered?*

Each of the alternatives could utilize current engineering technology for roadway and related construction. There appears to be no unusual or insurmountable technological limitations that would influence the practicability of alternatives considered for the proposed project.

D. *Are there other reasons certain alternatives are not feasible?*

As discussed in **FEIS Section 2.8**, important considerations relating to the practicability of alternatives include local and regional planning objectives (i.e., transportation, recreation, flood control, economic development, and environmental preservation), as well as the overall needs and welfare of the community. Throughout the project planning process, stakeholders have stressed that a major transportation improvement is likely to influence and shape local development. Local government agencies, as well as private citizens and developers, all anticipate some improvements or changes with respect to traffic circulation and economic development within the Trinity Parkway Corridor. Alternative 3C is the only alternative that could be considered consistent with local and regional planning efforts and compatible with community needs.

III. **If you have not chosen an alternative that would avoid wetland impacts, explain:**

FEIS Appendix G-1 provides a complete and detailed analysis of all the factors involved in the determination of practicability. To summarize, Alternative 2A and Alternative 2B were found to be not practicable. Alternative 3C is considered the least damaging practicable alternative that satisfies the project purpose and need, after taking into consideration cost, logistics, and technology.

IV. Please provide a comparison of each criterion (from Part II) for each site evaluation in the alternatives analysis.

Please see **Table G-2-2**.

TABLE G-2-2. COMPARISON OF ALTERNATIVE ANALYSIS CRITERIA

Factors	Unit of Measure	Trinity Parkway Build Alternatives		
		2A	2B	3C
Costs				
Estimated Construction Costs[1]	$ Millions per mainlane mile	37.6	29.9	21.9
Technology				
Major Technological Constraints[2]	Yes/No	No	No	No
Logistics				
Estimated Time to Complete Construction After Anticipated ROD	Years	10	9	6
High Risk HazMat Sites[3]	Number	34	35	17
Major Utility Constraints	Yes/No	Yes (relocate 52,000 linear ft. of water/sewer and 2 mi. of Oncor 345 kV line)	Yes (relocate 52,000 linear ft. of water/sewer, 2 mi. of Oncor 345 kV line, and the West Network Substation)	No
Waters of the U.S., Including Wetlands, and Water Quality				
Waters of the U.S. Including Wetlands Impacted	Acres	4.2	9.1	90.9
Water Quality Impacts	Yes/No	Yes	Yes	Yes
Storm Water Runoff Abatement Needed	Yes/No	Yes	Yes	Yes

Notes:
1. These 2011 estimates of project costs for comparative purposes are based only on construction costs and ROW and utility relocation costs, as described in detail in **Appendix G-1, Section 2.3.4.5**.
2. For the purpose of this analysis, a major technological constraint was considered to be any insurmountable technological issue that would influence the constructability, operations, or maintenance of a particular Build Alternative.
3. Hazardous waste/material sites considered to have a high probability for contamination located within or adjacent to proposed ROW.

END OF APPENDIX G-2

Appendix G-3

Preliminary Section 404 Mitigation Plan

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APPENDIX G-3 - PRELIMINARY SECTION 404 MITIGATION PLAN

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APPENDIX G-3

DRAFT SECTION 404 MITIGATION PLAN

PURSUANT TO THE SECTION 404(B)(1) GUIDELINES

1.0 INTRODUCTION

This document is a continuation of the Preliminary Section 404(b)(1) Guidelines Analysis for the proposed Trinity Parkway in **FEIS Appendix G-1**, which is incorporated herein by reference. To avoid unnecessary duplication of information, this document makes direct references to portions of the **FEIS Appendix G-1** discussion and maps. These materials have been prepared pursuant to the requirements of Section 404(b)(1) of the Clean Water Act (CWA) (33 U.S. Code Section 1344(b)(1)), and implementing regulations in 40 CFR Part 230 issued by the Environmental Protection Agency (USEPA). Those regulations are generally referred to as the "Section 404(b)(1) Guidelines" and are so referenced hereinafter. In this FEIS, the data and analyses required by Subparts C – G of the Section 404(b)(1) Guidelines are included in **FEIS Appendix G-1**, and the actions to minimize adverse effects (Subpart H) to aquatic resources and proposed compensatory mitigation (Subpart J) are addressed herein.

This is a preliminary mitigation plan for the proposed Trinity Parkway project in light of the requirements of Section 404 of the CWA, and Section 10 of the Rivers and Harbors Act of 1899, following compensatory mitigation guidelines outlined in "USACE Fort Worth Draft Mitigation Guidelines" (2003, revised in 2005). Compliance with the mitigation guidelines is a basic requirement for receiving a permit under Section 404 from the U.S. Army Corps of Engineers (USACE), which issues permits for the dredge or fill of waters of the U.S., including wetlands. This mitigation plan has been prepared as part of the Trinity Parkway Final Environmental Impact Statement (FEIS) for use in evaluating the proposed Build Alternative recommended by the Federal Highway Administration (FHWA). This mitigation plan is based on the preliminary design of the FHWA-recommended Alternative 3C, and identifies Section 404 impacts and necessary compensatory mitigation associated with the proposed action insofar as present design data allow. Some of the specific information may not be as accurate as final design plans.

The proposed Trinity Parkway Project is located in the Dallas-Fort Worth (DFW) Metroplex of north central Texas. The project area is located on the west side of the Dallas CBD in central Dallas County. The project area boundary extends from the Dallas CBD on the east to West Dallas on the west. The southern boundary is the U.S. Highway (US) 175/State Highway (SH) 310 interchange, and the northern boundary is the IH-35E/SH-183 interchange. The project area includes the Dallas Floodway, a federal flood conveyance and levee system carrying the main stem drainage flows of the Trinity River. **Figure G-1-1 in FEIS Appendix G-1** shows the project area, which comprises an area approximately 7,470 acres.

2.0 BASELINE INFORMATION REGARDING IMPACTS

2.1 ACTIONS TO MINIMIZE ADVERSE EFFECTS (SUBPART H)

This section provides information required by Subpart H of the Section 404(b)(1) Guidelines.

2.1.1 LOCATION OF DISCHARGE SITES

Avoiding and minimizing impacts to waters of the U.S., including wetlands, have been a major area of emphasis throughout the Trinity Parkway project development process. However, designing a major roadway within the Dallas Floodway presents unique challenges that arise from competing constraints. As the floodway's primary objective is to safely convey floodwaters, the placement of a major roadway must be done to ensure that the facility remains hydraulically neutral in terms of the 1988 TREIS ROD. That decision document adopted performance criteria which must be met before a project that would alter the cross section geometry of the floodway may be approved by the USACE. Most notably, constraints regarding maximum water surface elevation and valley storage for the 100-year flood and the SPF require iterative hydraulic modeling to achieve results that are at or near the 1988 ROD criteria. One major requirement for the Trinity Parkway is to be constructed above the 100-year flood elevation, which requires a sizeable amount of embankment material. To maintain hydraulic balance within the floodway, the embankment material must be excavated within the floodway. With a floodplain peppered with emergent wetland areas, it is a daunting challenge to excavate from one area within the floodway so that the fill material may be used to build the road embankment elsewhere.

Another major constraint in planning the Trinity Parkway relates to the placement of the roadway relative to the East Levee. Engineering concerns about levee safety have led to the requirement to modify floodway Build Alternatives to ensure a prescribed offset is kept, thus moving the roadway farther into the floodplain where aquatic features are more abundant. Thus, the evolution of project design has been a process of balancing the design of roadway and excavation areas to achieve hydraulic neutrality, levee safety, and avoidance of aquatic features. Accordingly, the history of efforts to avoid aquatic features in the design of the Trinity Parkway has been balanced by the need to ensure the safe operation of the Dallas Floodway as it conveys floodwaters.

Efforts to avoid and minimize impacts to water features have taken several forms. The following list highlights some of the measures taken to achieve that end while balancing the need for hydraulic neutrality and levee safety.

- Alternative 3C as presented in the SDEIS included culverts at pump station and pressure sewer outfall channels that would have resulted in impacts to these jurisdictional waters. The design was modified as presented in this FEIS to provide for bridges over the Baker pump station outfall, the Turtle Creek pressure sewer outfall, and the Bellevue pressure sewer outfall.
- In the area between the northbound IH-35E bridge and the Corinth Street viaduct, where the main stem river channel is close to the east levee, roadway embankment that was filling in a portion of the river was minimized in the design presented in this FEIS through the use of retaining walls.
- Other roadway design modifications made to minimize impacts involved 1) shortening the extent of the embankment in the floodway through the use of a 6-foot high gravity wall at the base of the embankment, which also provides a security feature to inhibit pedestrians from entering the roadway from the river side, and 2) removing embankment previously planned to be placed on the river side of proposed flood separation walls that protect the roadway from flood events in the areas where the roadway profile elevations would be lower to pass under the existing bridges crossing the floodway. These two design refinements narrowed the overall footprint of the proposed roadway and thereby helped to offset the encroachment further into the floodway and associated wetlands that resulted from the shift away from the east levee at the direction of the USACE to avoid levee-side retaining walls (see **FEIS Section 2.3.2.3**). These changes avoided an increase in impacts from fill that would have occurred otherwise.
- During the development of the excavation plan for roadway embankment material, thoughtful consideration was given to minimizing impacts to jurisdictional waters, while balancing the needs for suitable material, the need to excavate large contiguous areas in proximity to the roadway in the interest of having a plan that makes sense in terms of construction logistics, as well as a desire to be compatible with local plans for the floodway (i.e., the City of Dallas BVP and the USACE's flood damage reduction plan to improve the performance of the flood protection system).
- The borrow locations upstream of the IH-35E bridges have been placed in areas of the floodway overbank where emergent wetlands are less prominent. For example, excavation was completely avoided within the east overbank upstream of Westmoreland Road and within the entire floodway overbank on both sides of the channel between

Continental Avenue and the Hampton Road bridges, with the exception of a small area of excavation proposed just on the upstream side of the Continental Avenue viaduct. Borrow locations in the east overbank upstream of the Hampton Road bridge were shaped to avoid wetlands where possible by maintaining a 20-foot buffer from the edge of excavation. By avoiding these areas where jurisdictional wetlands are more abundant, 19 different wetlands totaling over 120 acres would be unaffected by the proposed excavation plan. In addition, with the exception of a small amount (less than 3 acres) of excavation within the Trinity River, all of the waters of the U.S., including wetlands that were identified as high quality features were avoided by the proposed borrow plan.

- Unfortunately, in the area between the IH-35E bridges and the DART bridge at the south end of the floodway, large areas of emergent wetlands are present and excavations in this area in particular are needed for hydraulic reasons. The Dallas Floodway narrows in the area of the Houston Street and Jefferson Boulevard bridges, creating a need for excavation downstream to keep water surface elevations in check. As such, the impacts to jurisdictional waters in this area could not be completely avoided. However, one major change to the proposed excavation plan was made during the development of this FEIS in order to minimize unavoidable impacts in this area. The excavation plan as presented in the SDEIS involved dredging and widening of approximately 5,150 linear feet of the Trinity River channel bottom to widths up to 150 feet upstream of the Corinth Street bridge. The excavation within the channel was largely eliminated and replaced with excavation of a secondary channel and hydraulic mitigation swale within the west overbank, effectively exchanging impacts to over 30 acres of high quality perennial stream for impacts to roughly 14 acres of low to medium quality emergent wetlands.

Iterative hydraulic modeling has been conducted in coordination with the USACE during the project development process to ensure that proposed embankments are offset by excavations and other design aspects so that the project will either meet the 1988 ROD criteria or be sufficiently close to those criteria to warrant consideration of a variance. Alternative 3C as presented in this FEIS meets the ROD criteria for both the 100-year and SPF events, with the exception of a maximum rise in the 100-year water surface elevation of 0.27 feet. This is a dramatic improvement over the results as presented in the SDEIS that have been achieved while making design improvements intended to avoid or minimize impacts to waters of the U.S., including wetlands.

As demonstrated above, ongoing coordination has been occurring with the USACE and the City of Dallas to ensure that the schematic design of Alternative 3C minimizes impacts to waters of the U.S., including wetlands, and would also be compatible with the flood conveyance mission of the Dallas Floodway. Overall impacts to waters of the U.S. have been reduced from 91 acres as presented in the SDEIS to approximately 66 acres as presented in this FEIS. While minimizing impacts to jurisdictional water features, the hydraulic results for the proposed project have also been improved to achieve the best possible results to date. The proposed project has included planning to avoid and minimize impacts to waters of the U.S., including wetlands, but complete avoidance is not possible. In particular, the impacts resulting from the proposed excavation areas for borrow material cannot be avoided as the current locations and geometry of these areas are a function of the requirement to meet the 1988 ROD criteria.

As discussed above, Alternative 3C would be constructed on embankments built using material borrowed from within the floodway. Direct discharges into waters of the U.S., including wetlands would occur as a result of placement of fill for the roadway embankment. Where possible, bridges will span aquatic features to avoid or minimize direct discharges into these features. Excavation areas shown in Map 3 were selected to meet several criteria. Analyses have been conducted to demonstrate the geotechnical suitability of soil materials from five proposed borrow areas identified for the Dallas Floodway alternatives (Terracon, 2009). The five proposed borrow areas, which correlate with the proposed location of Balanced Vision Plan features (City of Dallas, 2003) that will be evaluated for environmental acceptability and technical soundness by the USACE prior to implementation are shown on **FEIS Plates 4-15** and **4-16**, respectively. Wherever possible, the footprint of the borrow areas has been revised to avoid or minimize direct impacts to aquatic features. During final design, these impacts may be further reduced, so long as the hydraulic performance of the project is maintained, to reduce project impacts. Pursuant to 33 CFR Section 332.3, a compensatory mitigation plan has been developed to compensate for unavoidable adverse effects to waters of the U.S. including wetlands as a result of the proposed project. The purpose of mitigation is to replace aquatic functions and values lost as a result of the proposed project. As a result, through the purchase of mitigation banking credits, the proposed project would not result in a net loss of aquatic function.

2.1.2 CONTROL OF DISCHARGE MATERIAL

The overall mitigation structure for water quality impacts is a condition of the National Pollutant Discharge Elimination System (NPDES)/Texas Pollutant Discharge Elimination System (TPDES) requirements as well as other local, state, and federal stormwater runoff control and management programs. Additional mitigation measures have been developed for the handling of contaminated dredge and fill material. These measures are discussed in **FEIS Appendix G-1** and the attached Technical Memorandum. Implementation details for these mitigation measures would be developed and incorporated into project design and operations prior to project start-up. With proper implementation and monitoring of appropriate mitigation measures, short-term (construction-related) and long-term (operation-related) water quality impacts would be avoided or minimized. Detailed information concerning measures to minimize water quality impacts is provided in **FEIS Chapter 5**.

2.1.3 PLANT AND ANIMAL POPULATIONS

During construction, the Applicant would use BMPs to limit erosion and reduce sediment transport that result from storm water runoff from proposed project facilities and disturbance areas. Surface water control facilities would be installed as necessary to control off-site runoff to receiving waterways during construction. Prompt and effective revegetation of disturbed areas along the fringes of the development would further reduce the potential for erosion. Following construction, disturbed areas such as cut-and-fill slopes, topsoil and subsoil stockpiles, and other temporary site disturbance would be seeded. All sediment and erosion control measures would be inspected periodically, including repair of erosion and sediment control facilities as needed. Project construction will occur over several years; routine and seasonal site maintenance would include inspection and repair of drainage and sediment control facilities and installed erosion controls, routine landscape maintenance, and the cleaning of sediment ponds and ditches.

During and immediately following construction, there would be exposed soils. Erosion is expected to be limited to the immediate vicinity of the project, and the highest potential for soil erosion would occur during the construction period. The amount of disturbed earth would be carefully controlled so that potential for excessive erosion is minimized and sedimentation beyond the project limits is avoided. Temporary erosion and sedimentation control measures such as silt fences, rock berms, and/or soil retention blankets would be implemented as needed prior to the initiation of construction. Disturbed areas would be restored and stabilized as soon as the construction schedule permits. Effective implementation of stormwater BMPs would further minimize any short-term localized increases in suspended particulates and turbidity both during and following construction.

A soil and groundwater management plan (SMP) would be developed as part of the design and bid package in support of construction of Alternative 3C. The SMP would be designed to aid the contractor in determining the appropriate course of action when excavating and transporting fill material with COCs exceeding the Soil Ecological Benchmarks for use as roadway embankment fill. Discussions of the mitigation measures are included in **FEIS Appendix G-1** and the attached Technical Memorandum.

The goals of mitigation are to avoid and minimize adversely affecting sensitive natural resources and to compensate for losses of these resources if impacts are unavoidable. Implementation of BMPs would serve to minimize impacts to wetlands and other waters of the U.S. within the project area. Specific measures to reduce erosion and maintain water quality would be identified and include the following:

- Incremental grading and temporary native grass seeding to reduce soil loss during construction;
- Temporary exclusion fencing to avoid wetlands during construction;
- Stabilization practices such as rounding of ditches and slopes, erosion control blankets, reseeding with native species, and mulching impacted areas to reduce erosion;
- Installation of structural BMPs such as silt fences and erosion blankets in impacted areas to reduce off-site siltation;
- Development of an emergency spill response program and the implementation of spill-prevention practices such as locating staging areas and fuel and hazardous construction material storage sites well away from waters of the U.S., including wetlands, to reduce risks from accidental spillage and leaching;
- Disposal of surplus fill in non-wetland areas;
- Timing construction in and around open water to occur in late fall and winter when water levels are low, soil compaction is minimal, and vegetation is dormant;
- Threatened and endangered species surveys prior to commencement of construction, and development of species mitigation plans in the event species are located; and
- Sparing existing trees in impacted wetlands when possible and fencing around trees and shrubs to prevent damage.
- Development of a SMP detailing procedures to properly manage the excavation and re-use of borrow material exceeding Soil Ecological Benchmarks.

Unavoidable impacts to waters of the U.S., including wetlands, and to sensitive habitats are mitigated by restoration or replacement. The successful implementation of a compensatory mitigation plan should ensure that no net loss of waters of the U.S., including wetlands, and no cumulative loss of sensitive habitat result from the proposed project. As noted above in **Section 3.6.1**, all impacts to waters of the U.S., including wetlands would be mitigated in accordance with the permitted compensatory mitigation plan.

2.1.4 HUMAN USE CHARACTERISTICS

Currently, the project area offers limited opportunities for human use as the vast majority of the area is occupied by the Dallas Floodway system and its primary function is to serve as a flood control facility. The proposed project, although consistent with other planned projects such as the City of Dallas Balanced Vision Plan, would not appreciably affect human use of post-construction aquatic resources within the Dallas Floodway.

2.1.5 BEST MANAGEMENT PRACTICES

Construction activities for the proposed project would be suitably staged and implemented to avoid impacts (including temporary impacts) on the integrity of the levees, the safe and efficient operation of the floodway, or on the overall capability of the Dallas Floodway to convey its design floods. Such measures would be part of ensuring compliance with USACE flood control regulations (33 CFR Part 208), which include the requirement that construction activities within a flood control project "will not adversely affect the functioning of the protective facilities" at any time (33 CFR Section 208.10(a)(5)). Indeed, to ensure the detailed regulatory safeguards in these flood control regulations would be maintained during construction periods, USACE approval is required before construction may begin. The USACE Fort Worth District has issued guidance (USACE Pamphlet SWFP 1150-2-1, see **FEIS Appendix E**) that further implements the USACE flood control regulations at the local level by prescribing criteria for construction within floodways. In essence, this guidance (or any future superseding guidance) describes specific project design criteria and construction management measures that are preconditions to receiving USACE approval for construction. Additionally, construction activity within the Dallas Floodway would be subject to USACE construction phase oversight to ensure that flood conveyance attributes are maintained.

During construction of the FHWA-recommended alternative, several best management practices (BMPs) would be implemented to avoid and minimize impacts to waters of the U.S., including wetlands. The majority of BMPs would be associated with waters of the U.S., including wetlands, directly impacted by the excavation of potential borrow areas and the placement of fill materials for the construction of roadway embankments. However, BMPs would also be implemented in mitigation construction areas to avoid any incidental impacts to non-target waters of the U.S., including wetlands that would otherwise have been avoided. The following is a list of actions that would be taken to avoid and minimize impacts to waters of the U.S., including wetlands.

Incremental Grading

Phasing of the construction areas would serve to remove vegetation only in areas that are actively under construction. Maintaining vegetation coverage for as long as possible serves to reduce secondary impacts that may occur from erosion and sedimentation. Incremental grading should also serve to phase the eventual loss of aquatic function associated with the discharge or excavation activities rather than have the loss of aquatic function being absorbed all at once.

Preservation of Function for Partially-Excavated Wetlands

As discussed in **Section 2.7** of **Appendix G-1**, steps will be taken during the excavation of embankment borrow areas to preserve wetland function in emergent wetland areas that are only partially affected by excavation activity. The grading plan in final project design plans will require the construction contractor to create a new shelf along the wetland edge near the excavation area to prevent drainage. By preserving the hydrologic regime of remnant wetlands, the primary function of long-term surface water storage and other existing functions of these shallow wetlands would be preserved.

Temporary Exclusion Fencing

A qualified Section 404 mitigation specialist would identify all waters of the U.S., including wetlands that are proposed to be avoided or preserved in the vicinity of construction staging areas. Final design would incorporate the placement of temporary construction fencing to be placed around designated areas to help avoid accidental and/or unauthorized activities in waters of the U.S., including wetlands.

Stormwater Pollution Prevention Plan (SWPPP)

Stormwater runoff from construction activities can have a significant impact on water quality. As stormwater flows over a construction site, it may pick up pollutants like sediment, debris, and chemicals and subsequently deposit them in receiving waters, including wetlands. Implementation of a SWPPP through the use of various soil stabilization and runoff control procedures would serve to regulate stormwater runoff from the construction areas thereby minimizing potential indirect impacts to waters of the U.S., including wetlands.

Soil Stockpiling

In the event that soil stockpiling is required during construction, a Section 404 mitigation specialist would work with the final design team to identify disposal sites that would avoid any unauthorized placement of fill within waters of the U.S., including wetlands. Because excavation of the borrow areas would occur concurrently with the construction of the roadway embankment, it is not anticipated that substantial soil stockpiling would occur. Final design would include a soil management plan for construction operations, which outlines construction phasing and soil stockpiling to avoid and minimize disturbance of waters of the U.S., including wetlands, and associated buffer areas.

Inundation of the Construction Area

Because of the Dallas Floodway location, an Emergency Action Plan would be prepared for the Trinity Parkway and submitted to the City of Dallas Flood Control District and the USACE for approval prior to construction. The Plan would be implemented in the event of imminent flooding into the floodway overbank during construction, and would address emergency actions for any flooding event that may occur throughout the duration of project construction. The Emergency Action Plan would establish procedures to evaluate and react to flooding events, both as the event is being forecasted and as the event occurs. The Emergency Action Plan would also identify a sequence of actions to be taken after a flood event. The Plan would be implemented based on river flood stage data. The Plan would include provisions for the Flood Control District to allow unhindered access for flood fighting activities.

The early stages of construction would involve building up the roadway embankment to the designed elevation above the 100-year flood and completing the flood separation wall in the depressed areas where the roadway would pass under the existing cross street bridges. This would minimize the amount of time that the work areas could be subjected to more frequent out of bank events, and once completed would create protected work areas for installing pavement, utilities, signage, and traffic barriers. The proposed 6-foot high security wall at the river side of the roadway embankment would also be constructed during the early stages and would provide some benefit to protect the embankment area from typical out of bank events.

As previously discussed, pre-construction activities will include the installation of BMPs including erosion and sedimentation control devices such as silt fences, rock berms, and/or soil retention blankets as needed in accordance with the SWPPP. A consideration in the development of the Emergency Action Plan will be the possibility of damage to structural controls occurring due to inundation from floodwaters, which may be greater than typical isolated events of accidental damage that can occur from construction equipment during earthworks activities. In the event of inundation of the construction area and damage to structural controls, repair work to restore and stabilize these devices would commence as soon as feasible to limit the loss of soil/sediment from the construction area and potential impacts to natural resources. The frequency and duration of such events are unpredictable; therefore, permanent erosion control features would be constructed as soon as feasible during the early stages of construction through proper sod placement and/or seeding techniques. Temporary sod would be considered where large areas of disturbed ground would be left bare for a considerable length of time. The areas proposed to be excavated for borrow material for the roadway embankment within the floodway are planned as dry excavations and would drain to the Trinity River channel as floodwaters recede. Because a large amount of the soil material is clay, it is expected that once the borrow excavations are compacted they would not be severely scoured if grass has not yet been established.

Construction activities would be suitably staged and implemented to avoid impacts (including temporary impacts) on the safe and efficient operation of the Dallas Floodway or on the overall capability of the Dallas Floodway to convey its design floods. With the exception of equipment and materials actively utilized in the day-to-day construction operations, construction equipment, excess materials, supplies, forms, buildings/trailers, or other materials that could be transported by flood flows will not be stored in the floodway during construction. Stockpiling of excavated material would be minimized to prevent increasing water surface elevations should a flood occur and to avoid interference with the ability of the floodway to convey floodwaters. Stockpiles of excavated material would not result in the temporary or permanent fill of waters of the U.S., including wetlands, beyond those aquatic features already identified as disposal sites in the Section 404 permit or RGP 12 authorization.

All of these measures would be part of ensuring compliance with USACE flood control regulations (33 CFR Part 208) and guidance found in USACE Pamphlet SWFP 1150-2-1 (see **FEIS Appendix E**).

Soil and Groundwater Management Plan Development and Implementation

A SMP would be developed as part of the design and bid package in support of construction of Alternative 3C. The SMP would be designed to aid the contractor in determining the appropriate course of action when excavating and transporting fill material with COCs exceeding the Soil Ecological Benchmarks for use as roadway embankment fill. Implementation of the procedures detailed in the SMP will ensure that the COC affected soil is managed properly and re-used as fill only within the core of the roadway embankment during construction of Alternative 3C. The SMP will include the following to minimize adverse effects resulting from the re-use of fill material containing COCs exceeding Soil Ecological Benchmarks:

- The affected fill material will be re-used in a location where the substrate material in the re-use area is of similar composition to the fill material. The fill material will be placed within the core of the roadway embankment.

- The affected fill material will be encapsulated with unaffected floodway material, thus eliminating potential exposure to ecological receptors.

- Maintenance of the roadway will minimize the potential for erosion, slumping, or leaching affected fill material and prevent a potential future source of pollution.

General requirements for management of COC affected soil excavated from the borrow sites would be outlined in the SMP. Procedures for proper storage, sampling and analytical testing, transportation and re-use of COC affected soil would be identified. A detailed discussion is presented in the Technical Memorandum attached to **FEIS Appendix G-1**.

2.2 IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

The FHWA-recommended alternative would unavoidably involve the deposition of fill into wetlands considered waters of the U.S. Such fill impacts may occur as the result of roadway construction which will include the following major elements: use of fill for road embankments within floodplain areas; fill to construct bridge abutments; bridge support columns; retaining walls; and installation of culverts. In addition, alteration of existing contours and deposition of fill would occur through the excavation of borrow areas. The anticipated unavoidable impacts to aquatic resources are described in **FEIS Appendix G-1, Section 2.7**, and **Table G-1-10** provides a quantitative estimate of affected waters of the U.S., including wetlands, and aquatic condition and function associated with those losses for the FHWA-recommended alternative; the locations of these aquatic features are shown on **Maps 2** and **4** of **FEIS Appendix G-1**.

3.0 SITE SELECTION

This section and **Section 4.0** provide information required by Subpart J of the Section 404(b)(1) Guidelines.

3.1 ALTERNATIVE SITES EVALUATION

New standards and criteria for addressing all types of compensatory mitigation under the Section 404(b)(1) Guidelines were promulgated in a joint USEPA/USACE final rulemaking in 2008 (70 *Federal Register* 19594-19705, April 10, 2008, amending 40 CFR Part 230 and 33 CFR Part 332). These standards in general state that the mitigation should occur within the same watershed as the impact site. They also note that the applicant should first consider mitigation bank credits and in-lieu fee program credits over applicant-responsible mitigation. Mitigation bank credits offer large scale consolidation of mitigation under a sponsor entity, and are generally developed with input from professionals experienced in the field of mitigation.

The applicant proposes to compensate for the loss of aquatic functions associated with the waters of the U.S. impacts through the purchase of mitigation banking credits. The project area is located within the service area of several mitigation banks including the Bunker Sands Mitigation Bank, South Forks Trinity River Mitigation Bank, Mill Branch Mitigation Bank and Trinity River Mitigation Bank. As such, the applicant proposes to purchase the appropriate number of credits from one of the available banks, or a combination thereof, depending on which bank has the required number of credits available at the time of the purchase. As more mitigation banks are expected to enter into service by the time the FHWA-recommended alternative is constructed, it is anticipated that the TXRAM assessment will be the appropriate means of calculating the appropriate mitigation banking credit determination. In the absence of an available TXRAM-based mitigation bank, the HGM assessment and function index will be relied upon to provide a qualitative rating to assist in evaluating credit determination.

3.2 SITE COMPATIBILITY

As previously mentioned, the project area is located within the authorized primary service area of several authorized mitigation banks in the Fort Worth District, thus satisfying both the watershed approach to mitigation and the consideration of mitigation banking as outlined in 33 CFR Part 332.

4.0 COMPENSATORY MITIGATION

The primary goal of any mitigation plan is to ensure no net loss of aquatic resources and functions. By using a TXRAM-based mitigation bank, the applicant may ensure the goal of no net loss by purchasing the appropriate number of mitigation banking credits based on TXRAM scores of the impacted aquatic features and the credits available at an available TXRAM-based mitigation bank. The required number of credits would be calculated consistent with debit procedures outlined in the mitigation banking instrument respective bank(s).

As previously stated, in the absence of an available TXRAM-based mitigation bank, the HGM assessment will be relied upon to determine the appropriate number of mitigation banking credits to satisfy the goal of no net loss of aquatic resources and function. As credit ratios vary between currently operating mitigation banks, the function index will be used to determine appropriate number of mitigation banking credits required.

The applicant shall demonstrate compliance with the compensatory mitigation plan upon completion of the credit purchase at a USACE-approved mitigation bank. While the final amount of credits to be purchased would be determined upon final design, **Table G-3-1** provides mitigation bank credit scenarios for two banks whose service area includes the proposed project. These data are preliminary estimates to illustrate the debit ratio (or multiplier) that would likely be used to compute the number of credits needed for mitigation for wetland and open water habitats. The cost for either scenario could range from $2.7 million to $3.2 million depending on the bank and the credit price at the time credits are purchased. Other banks currently exist, and additional banks may be added, whose service includes the project area. Depending on credit availability at the time of purchase, credits may be purchased from a bank or combination of banks, with different debit ratios than provided in **Table G-3-1**. Debit ratios from banks different than those presented in **Table G-3-1** will be consistent with procedures outlined in the respective mitigation banking instrument approved for each bank.

TABLE G-3-1. POTENTIAL WETLAND/OPEN WATER MITIGATION BANK CREDITS

Aquatic Feature Type	Potential Impact	Debit Ratio	Credits Needed
CREDIT PURCHASE SCENARIO FOR MITIGATION BANK #1			
Wetland			
Emergent Wetland (low quality)	15.43 acres	1.2	18.5
Emergent Wetland (med. quality)	34.82 acres	1.8	62.7
Forested Wetland (high quality)	1.40 acres	2.3	3.2
Open Water	6.13 acres	1.2	7.4
CREDIT PURCHASE SCENARIO FOR MITIGATION BANK #2			
Wetland			
Emergent Wetland (low quality)	15.43 acres	2	30.9
Emergent Wetland (med. quality)	34.82 acres	3	104.5
Forested Wetland (High Quality)	1.40 acres	5	7.0
Open Water	6.13 acres	2	12.3

A preliminary estimate for the purchase of mitigation bank credits for impacts to river or stream channel impacts is shown in **Table G-3-2**. This estimate is based on the linear feet of impacts to waters of the U.S., as approximated for a mitigation bank with channel impact credits whose service area includes the project area. The preliminary estimate of cost to for river/stream credits needed for the Trinity Parkway would be approximately $1.0 million. The future purchase of mitigation bank credits would be subject to credit availability and price at the time of purchase as described above for wetland and open water credits. The mitigation bank scenario presented in **Table G-3-2** does not incorporate the new Fort Worth District Stream Mitigation Method (SMM) that went into effect October 2, 2013 (USACE Fort Worth District Public Notice CESWF-14-MIT-1). The SMM policy implements a regulatory preference for purchasing stream mitigation credits from a mitigation bank with credits based on TXRAM evaluations. Should stream credits be available at a mitigation bank whose service area includes the project area, then the mitigation of stream impacts must consider the purchase of the appropriate credits consistent with the SMM policy.

TABLE G-3-2. POTENTIAL RIVER/STREAM MITIGATION BANK CREDITS

River or Stream Channel Type	Length of Stream Channel Impacts	Debit Ratio	Credits Needed
Old Trinity River Channel	460 linear feet	0.008	3.7
Intermittent Stream	520 linear feet	0.008	4.2
Perennial Stream	2,900 linear feet	0.019	55.1

The applicant will coordinate the final mitigation bank credit purchase with the USACE, complete the credit purchase, and provide documentation of the purchase to the USACE prior to construction in waters of the United States.

END OF APPENDIX G-3

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